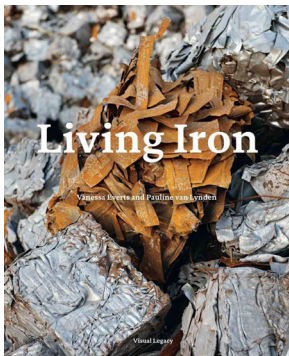


Book reviews

Living iron by V Everts and P van Lynden. *Doorn, Netherlands: Visual Legacy, 2018. 240pp, 223 x 272mm, 353 figs (most colour), index, ISBN 978-90-811850-5-9, £36.00, p/b. Also available in Dutch (ISBN 978-90-811850-6-6).* <https://www.vanessaeverts.com/books/>



Living Iron is a delightful publication on the history, importance and beauty of iron. It combines a decent historical overview from the very beginnings till now, not only of iron production technology but also of the objects made, with information on iron-related mythology, linguistics and biology. The well-written

text deals with the wide-ranging subjects in a clear and concise manner and is interspersed throughout with interesting tidbits and anecdotes. The book is copiously illustrated with stunning photography, much of which concentrates on the many varieties and expressions of rust.

A first chapter details the chemical history of the element iron up till the geological formation of iron ores, including meteoritic iron and the connection between the emergence of oxygen-using life forms and the formation of the Banded Iron Formations.

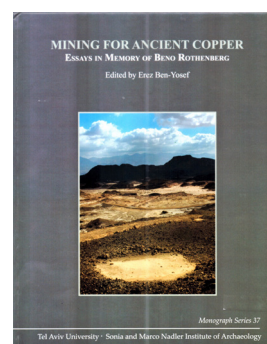
The next eight chapters provide a chronological global overview of the development of iron smelting, forging and objects from the early Iron Age until the twentieth century. A world-wide overview of the manifestations of iron across time is in itself of great value but, in this case, does include some information for which there is no evidence or which is incorrect: the suggestion that the earliest iron smelting probably consisted of heating iron ore with dry wood in a pit, the claim that monks all over Europe collected iron ore when not working the land, and the statement that the fining of cast iron led to steel (while later on describing the process correctly). It does, however, include topics of interest which could have been omitted, such as the water-powered bloomery and the nineteenth-century cast iron jewellery known as Berlin Iron.

The following two chapters concentrate on the various ways by which iron and steel is obtained today and how these are shaped into the objects around us. The next part is dedicated to rust and stainless steels. The pictures in this chapter are especially beautiful. Next, the book discusses the recycling of iron and steel, including insights into the difficulties surrounding scrapping of ships. Then follows a chapter nicely describing the history and technology of the humble tin can, and the book ends with insights into the role of iron in the human body.

Living Iron is both a very attractive and rather unique coffee table publication on this most vital of metals as well as a more than passable historical overview of its global use. The value of the work, however, is greatly tarnished by the omission of any indications of where the information was found (the illustrations, on the other hand, are sourced). This book was at least in part seen as an arts publication, which might offer some excuse for the near complete lack of referencing to sources, but not including at least a 'Further Reading' chapter is a disservice to its readers.

Paul Rondelez

Mining for ancient copper. Essays in memory of Beno Rothenberg edited by Erez Ben-Yosef. *University Park, PA: Eisenbrauns and Tel Aviv University (Sonia and Marco Nadler Institute of Archaeology Monograph 37), 2018, 209 x 265mm, 584pp, ISBN 9781575069647, h/b, \$149.95.*



This book is a collection of papers presented at the conference entitled *Copper in Antiquity* held at the Timna Park in 2013. Both conference and volume are appropriately dedicated to the memory of Beno Rothenberg who is largely considered a pioneer on the topic of ancient mining and metallurgy. Rothenberg cut his archaeological teeth in his fieldwork on the smelting and mining sites in the Arabah Valley in Israel, principally the site of Timna. The volume includes a total of 37 chapters grouped

into five sections. Most of the contributions selected for this volume are based on presentations given at the conference, while others have been solicited and written especially for this publication. In his preface the editor, Erez Ben-Yosef, promotes mining for ancient copper as a broad-based approach that ‘emphasizes common denominators in the study of copper across diverse cultures and space’. This collection of reports and studies largely succeeds in that goal.

The new perspectives and revisions included in the first section address Rothenberg’s previous work in the Timna Valley and set the tone and standard of the succeeding pages that treat mining operations in the surrounding regions. James Muhly provides a chronological treatment of the mining and smelting operations at Timna and its environs. Muhly undertakes the task of rectifying some of the earlier misinterpretations of the first Timna workings, and –what may seem like irreverence – he corrects some of Rothenberg’s early claims of Chalcolithic workings. Now based on a new radiocarbon date of Site 39b, the workings have been shown to date between 400–450 BCE. In all fairness to Rothenberg, it is an on-going challenge to date mining and metallurgical workings, so he can be forgiven. While Muhly provides a well-documented summary of the Timna’s workings, it would have been useful if he had included a comprehensive chronological chart. Other missing documents that would normally have been included in a Festschrift are a bibliography of Rothenberg’s publications, and you are also out of luck if you wanted to read a short biography, though a footnote on where to find an account of Beno Rothenberg’s life and work is provided.

Before reading the entire volume I was ready to raise one of my prime issues, that of the role of ritual in mining. However, Nissim Amzallag’s chapter concentrated on the Iron Age sanctuary at Timna. The first phase of the temple is dated to the 14th–12th centuries BCE and is devoted to the Egyptian goddess of mining, Hathor, sometimes referred to as ‘the mistress of galena’. During the Early Iron Age she was replaced by a Canaanite deity whom Amzallag identifies as YHWH. This shift in spiritual devotion represents ‘the emergence of new political entities, including Ancient Israel’. The presence of cosmic/spiritual entities associated with mining and smelting has been largely ignored by those who have written on ancient mining, with the exception of British scholars who have devoted considerable and valuable insights into cosmic and mythological relevance in mining contexts. Amzallag’s excellent chapter should encourage future research and publication on the ritual

aspect of ancient mining.

In his chapter Aaron Shugar provides a commendable discussion on the copper artefacts from Abu Matar and characterizes the ore types from which these artefacts were made. He raises the appropriate questions regarding the provenance of the copper and distinguishes the prevailing difference between the artefacts from Abu Matar (of local manufacture) and those from the Nahal Mishmar hoard (manufactured locally but perhaps made of copper imported from afar). What is interesting from a technological perspective is that arsenical copper prills were found embedded in the smelting slag at Abu Matar which, according to Shugar, ‘suggests the potential for co-smelting of arsenic-rich ores with copper ores’. Ghassulian metallurgy inherently used arsenical copper which Shugar claims was ‘culturally driven’, an observation that leads to the notion that preferences and traditions are inherent in metallurgical practices and rise above other (and perhaps preferable) technological outcomes. Technological conservatism is reflected in the rituals, traditions and mysticism that stem from cosmic connections with the earth, and the process of material transformation that result in the emergence of metal. The magic and wonderment of that transformation never left the minds of ancient smelters and bound them to ancestral practices.

The six chapters of section four takes us to mining activities beyond the Levant: to Cyprus, Oman, Greece and Great Britain. We are treated to discussions on the Late Bronze Age miners’ settlement in Apliki, Cyprus, mines dated to the 1st century BCE; the copper production in the northern al-Hajjar Mountains of Oman; a study of one of the mines in Mount Pangaeon in NE Greece; a cursory study on the Bronze Age Great Orme copper mine in north Wales; and finally a study on small-scale mining activities in western Britain in the Bronze Age, *c*2000–1500 BCE). The value of such a diverse presentation of sites and reports, it seems to me, is that it presents an opportunity to see where there is commonality across time and space, and to observe how excavators approach the same line of questioning we all have: mining technologies, ore dressing, smelting techniques, trade and links to the outside. This is, in fact, what the editor, Ben-Yosef, intended.

Section five, entitled Metalworking, comprises eight chapters devoted to topics related to iron production, copper alloying, recycling, mending, casting, and copper objects. Yulia Gottlieb suggests that the coexistence of copper and iron working may not be so much a question of available technology but (again!) cultural

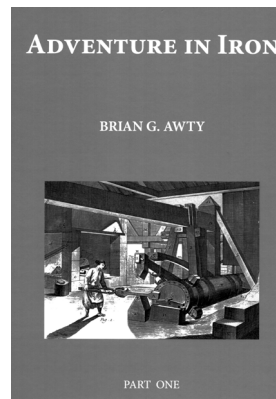
conservatism based on a chieftom-led tribal society in the northern Levant that favoured copper while a centralized and militant-style society in the south adopted iron. Criticisms come hard in Gottlieb's well-documented chapter but one significant conclusion can be drawn from it: iron did not come in with a roar. It is clear that at many sites in both the north and the south iron and copper production co-existed. Eventually, cultural biases, political imperatives, and the ease of production tipped the balance to either copper or iron.

The authors in this collection of texts cover a lot of ground and accomplish much. While some readers might wish that anthropological studies had been included with greater emphasis, it is unfair to want everything under one cover. Yet I cannot refrain from noting that when reporting on industries, such as mining and smelting, we have to acknowledge that these operations are not self-contained, that their roles fit into a larger context. Mining and smelting are a reflection of life elsewhere, and their product, metal, is a component of a grander expression. Copper, and later iron, were just raw materials. Their final use lay in the demands of everyday society. Metal was made into knives and chisels that cut up food and shaped objects out of wood. Spears and arrowheads were used to defend borders, even empires. Razors shaved beards and cut hair. Needles were used to sew garments. The users of these items were the true driving force of mining and metal production. This volume is a significant contribution to that picture and will stand as a valuable reference to understanding resource industries that served complex societies in the Bronze and Iron Ages and beyond.

Prentiss de Jesus

A full Table of Contents, listing the titles and authors of all chapters can be found at <https://www.eisenbrauns.org/books/titles/978-1-57506-964-7.html>.

Adventure in Iron: The blast furnace and its spread from Namur to northern France, England and North America, 1450-1650; a technological, political and genealogical investigation by Brian G Awty. Prepared for publication by J S Hodgkinson and C H C Whittick. *Tonbridge: Wealden Iron Research Group, 2019. xviii + 977pp in 2 vols; 302 x 216mm; 37 figs and maps, 18 tables, 2 appendices, detailed contents pages, footnotes and bibliography, indexes of places, subjects and personal names. ISBN 9781916042308, £45+p&p, h/b.* Only available from www.wealdeniron.org.uk.



This is a very important work, long awaited by this reviewer. It concerns the spread of a two-stage process under which pig (or sow) iron was produced in a blast furnace and was then fined to make (wrought) bar iron in a finery forge. At its core is detailed research done over many years on the genealogy of the skilled artisans of the iron industry, migrating from Namur and Burgundy to Bray on the eastern boundary of Normandy, then to the Weald of Kent and Surrey, and after that to the rest of England and Wales, Scotland, Ireland and ultimately America. The author has traced where many of the men worked from the usual genealogical sources, such as parish registers, augmented by denization (naturalization) records from the 1540s and records of payment of a higher rate of lay subsidy as foreigners. Accounts of such families appear throughout the two volumes.

The early chapters deal with the 14th and 15th century iron industry on the Continent, including Namur and Burgundy (chapter 2) and the Bray *pays* on and beyond the eastern boundary of Normandy (chapter 4). This provides a lengthy background to the arrival in 1490 of the new technology at Queenstock in Buxted, a Sussex estate of Lord Chancellor Morton (chapter 5). These are followed by a series of chronological chapters dealing with successive 25-year periods and a final one expressed as for 1575-1650, but sometimes extending into the 18th century. These chapters focus on the iron industry in the Weald, but chapters 8 and 9 also examine the spread of the same technology into the rest of England (and also Scotland, Ireland and the American colonies). A significant portion of each of these chapters consists of family histories of individual ironworking families. These are not genealogies in the conventional sense, but rather compilations of occurrences of people sharing a surname, who were involved in the iron trade and probably related.

The presence of iron workers in various parishes suggests there were ironworks there. This provides additional evidence as to their dates, sometimes showing they existed for longer than was known from other sources. Much of the book focuses on the Weald, with its host of early ironworks. The coverage of Yorkshire (to where the author retired) may be more detailed than for the Midlands or South Wales. A possible forge at Wentbridge (Yorks) depends of the address of a single

witness in a 1680 case. The existence of one at Soulton Mill in Wem is deduced from a cluster of iron workers there between 1610 and 1622. Another forge is identified at Witton in Aston juxta Birmingham, but this might be a reference to Holford Mill, across the river Tame from Witton. However, the baptism of a daughter of Thomas Crosse, the clerk of Bromford Forge (also in Aston), in 1606 provides an early reference to it.

From the historiographical point of view the work is somewhat dated, as is inevitable with a posthumous work such as this. It was largely completed in the early 1990s, but failed to find a publisher. The bibliography contains few works published after 2000 or even 1995, other than the author's 2007 article in *Technology and Culture*, covering ground contained in this work's earlier chapters, and two articles relating to the Weald, probably added by the editors after the author's death. He thus cites the 1987 (not the much fuller 1993) edition of Riden's *Gazetteer of Charcoal Furnaces* and the 1989 edition of *Waterpower on the Sheffield Rivers* (ed D Crossley *et al*), not the 2006 edition (ed C Ball *et al*). There are some oddities in the structure of Chapter 9, perhaps inevitable as the editors have probably sought to publish all the content available. It has an epilogue which might have made an appropriate the ending to the core of the book. However, this is followed by an 'ironworking profile' considering aspects of social history, which might usefully have been elevated into being a separate chapter. Finally, there is a section containing family profiles that failed to find a place in the body of the book, which could have been an appendix.

Slight care is needed in the use of the book. Its research methodology can generate dubious ironworks or imply multiple sites when there was one. The author refers to Burrington Forge, but this is probably a duplicate of

Bringwood, which was in that parish. His reference to Shenstone (Staffs) might trap the unwary into thinking this was a separate site from Little Aston Forge. Similarly, the Nether Hammer in Wombourne may be the same as Greens Forge, the upper one being Heath Forge. On the other hand, some of the workers in Kingswinford could have worked at Cradley, which is also just beyond the Kingswinford's ancient boundary. Similarly, Awty refers to a slitting mill at Stourton (Staffs), a site usually known as Hyde Mill, but he dated it to 1614, much earlier than the well attested date of 1627. He makes a linkage to Sir Williams Whorwood, Henry VIII's attorney-general, who died in 1545, half a century before certain relatives (at Sandwell in West Bromwich) had a marginal involvement with the industry in the 1590s. Awty was a historian not a metallurgist, so that his account of ironworking processes follows what eminent metallurgists such as H R Schubert and R F Tylecote wrote, rather than providing novel insights into them. However, his work has firmly established the chronology for their introduction and spread.

Without question this is an extremely important work, tracing the spread of new ironmaking technology in the late medieval and early modern period. It is well presented, with copious indices, which was (it is understood) extremely expensive to produce, no doubt on account of the variability of historic spelling. It is certainly the culmination of the author's life's work. It is a pity that the author was unable to find a publisher, to enable him to complete it himself and see his magnum opus in print in his lifetime. It is easy for a reviewer to be critical and to find fault, as for example the few errors noted above. Nevertheless, all in all this is a magnificently comprehensive work which is unlikely to be superseded for a great many years.

Peter King