

# Book reviews

**Travail de la terre, travail du feu. L'espace rural autour d'Argentomagus (Saint Marcel, Indre)** by Françoise Dumasy, Nadine Dieudonné-Glad and Laure Laüt with contributions by J Andreau, C de Belvata Balsay, I Bouchain-Palleau, L Brissaud and J-F Croz. *Ausonius Éditions (Mémoires 23), Bordeaux, 2010, 290x220mm, 525pp, 316 figs, 1 DVD, ISBN 978-2-35613-032-7, h/b, €70.*

This is a comprehensive study of the area within a 20km radius of Argentomagus, modern Saint Marcel, near Argenton in central France. Argentomagus was the second largest town of the Bituriges, the largest being Avaricum (modern Bourges), 80km to the north-east. According to the *Notitia Dignitatum*, Argentomagus became the seat of an imperial arms factory during the reign of the Emperor Diocletian, the only one in Gaul that produced *arma omnia*, all kinds of weapons and armour.

The aims of the interdisciplinary studies presented in this book are the investigation of the relation between agricultural and metallurgical activities, the impact of the town on the countryside and vice versa, the assessment of road and river transport, the chronology from the late Iron Age (2nd century BC) to late antiquity, as well as the evolution of the studied area.

The book is divided into four parts. In part one (chapters 1 and 2) Françoise Dumasy gives a critical reassessment of the literary sources on the metallurgy of the Bituriges as well as a history of the archaeological studies carried out in this region since the mid 19th century. Chapter 2 covers the geology and topography of the area as well as the aims of the study and the methods employed.

In the second part (chapters 3 to 5) Laure Laüt covers the archaeological sites of the area studied. All in all, 172 sites that can be broadly described as rural were documented in the course of the survey. The sites have been divided into the following groups: fortified enclosures, farms, Roman *villae* of different sizes and hamlets, as well as sanctuaries and cemeteries. Ancient finds have been reassessed and new finds made during the survey are also presented. Traces of the Roman parcelling of

the land were documented and the relationship between the location of rural settlements and the value of the land for agriculture has been studied. In addition to these sites, 242 iron-smelting sites were located, 114 of which were Roman. Other crafts represented in the area are quarrying and stone masonry as well as pottery and glass production.

Part 3 of the book (chapters 7 and 8), written by Nadine Dieudonné-Glad, is dedicated to the excavation of the bloomery site at Latté à Oulches and the related metallurgical studies. The site lies in the valley of the river Creuse, next to a Roman road. The metallurgical workshop in Oulches is one of the very few bloomery sites of Roman Antiquity that has revealed a set of organised structures corresponding to all stages of iron production: ore dressing, charcoal production, reduction of the ore to metal, bloom smithing and forging of semi-products. There is also strong evidence that cast iron and hyper-eutectoid steel were decarburized on the site. The workshop consists of a bloomery furnace, an unusual charcoal production facility in the form of a furnace, a hearth for bloom smithing, two additional furnaces and a pool with a water pipe leading towards it. One of these furnaces (furnace 4) and the pool are for reheating of glassy slags to release the carbon-rich iron prills inside the slags. Experiments have shown that glassy slags break easily when they are heated and then plunged into cold water. The iron prills contained in the slag can then be easily collected. These iron prills as well as the occasional piece of cast iron had to be decarburized to make them forgeable. Metallographic analyses showed that some of them had been partially decarburized; furnace 3 seems to be connected to this operation. The dating of the workshop from coins and ceramics show that it was in use from the end of the 3rd to the second half of the 4th century. In the 4th century it seems to have been a stable ongoing activity, probably supplying the arms factory in Argentomagus.

Part 4 (chapters 9 to 11), by Françoise Dumasy and Laure Laüt, deals with the economy of the region, starting with transport on rivers and the road network. Two poles of activity characterize the economy, namely agriculture and metallurgy. In the period between the late Iron Age and early Roman times (2nd century BC to the

middle of the 1st century AD) agriculture was centred to the south-east of Argentomagus and the metallurgical activity to the north of the town. During the height of the Roman Empire (middle of the 1st century to the end of the 3rd century AD) the metallurgical activity intensified considerably. Large agricultural estates of the *villa* type became more numerous, especially to the south-east of the town, but also to the north, in the vicinity of large scale iron works. The area to the south-west is nearly totally empty of settlements and seems to have been covered by forests. Late antiquity (end of the 3rd to the 5th century AD) brought the decline of both activities.

The appendices contain lists of the Gallo-Roman sites as well as tables of the results of metallurgical analyses and micrographic observations.

This really is a truly extensive and exemplary study of a geographic region and the development of its agriculture and iron working. One of the most important results for everybody interested in Roman iron metallurgy is the discovery of the first evidence of decarburization of high carbon steel on the site at Latté à Oulches. So far it has been thought that accidentally-produced high carbon steel was discarded. The research presented in this book should make archaeologists as well as metallurgists working on Roman iron production start to think along different lines.

It is however very regrettable that there are no English summaries at all. Summing up the most important results of the research discussed in each chapter would make the book more easily accessible to readers with no or poor French.

Brigitte Cech

**British cast-iron firebacks of the 16th to mid-18th centuries** by Jeremy Hodgkinson *Hodgersbooks, Worth, Sussex, 2010, 270 x 210mm, 278pp, 342 plates, ISBN 978-0-9566726-0-5, £24.99, p/b.*

Cast-iron firebacks were a minor product—in terms of weight—of the blast furnace, which was introduced into the Weald of south-east England at the end of the 15th century. Their manufacture was a speciality of the Wealden industry; small quantities were cast in the west Midlands, but few elsewhere. The 16th and 17th centuries were a period of new building and rebuilding on an unprecedented scale, by landowners and farmers, as well as by urban tradesmen. The decorated cast fireback was just one of the signs of wealth displayed by those involved in the ‘Great Rebuilding’. This book, remarkably, is the first thorough published survey of these artefacts,

and will be of value not only to historians of the iron industry but to vernacular and polite building studies. The author outlines the history of fireback manufacture and trade, and summarises the scattered bibliography. The emphasis is on south-east England, but there is brief reference to Midlands examples, and to overseas castings, notably in Norway, Germany and the eastern United States. There is brief reference to cast iron grave slabs, also a Wealden speciality.

A substantial proportion of the text is devoted to an excellent study of the methods and motifs of decoration. This not only clarifies how the moulds and castings were made, and the associations of many of the motifs used, but will aid the interpretation of decorations on firebacks discovered in the future. Until the 18th century, Wealden firebacks were cast direct from the smelting furnace, for the foundry, re-melting pig iron, only came into use after 1700. Open moulds were used, formed by pressing patterns into the sand. The major distinction is between moulds formed by stamping commonplace items into the sand, for example rope for borders as well as free-hand work in the sand, and the use of complete wooden patterns for firebacks intended for the top end of the market. There is a thorough discussion of the use of heraldic motifs, those of landowning families, particularly those with ironworking interests such as the Ashburnhams, Pelhams and Sackvilles, and those designs associated with the Crown.

There is a brief but clear section on firebacks cast since c1800, when iron production in the Weald came to an end, whether as copies, as original designs or a combination of the two. Direct copies of originals, where the latter has been used to form the sand mould, can be identified by the reduced dimensions of the copy casting, where comparison with originals is possible. This is due to shrinkage of the copy during cooling. There is however no mention of differences in composition (particularly sulphur content) between castings made from the product of charcoal-fuelled furnaces and those using later iron from coke-fuelled blast furnaces.

The text is well illustrated, with 342 images, and for many readers these will be the most valuable part of the book. The photographs are generally of high quality, particularly given the problems of recording examples whose decoration is in low relief, and where awkward siting makes for difficulties in positioning lights and camera. Commendably few shots suffer from back-glare and the images have been manipulated or printed to provide maximum contrast. In most cases the photographs have been reduced to a scale of 1:10. There is however

a question concerning the location of information about individual firebacks, which can be found in three places: the list of contents (pp 11–38), the captions set beneath the images and, thirdly, the descriptions which form the appendix entitled ‘Details of Firebacks’ (pp 221–269). There is repetition between entries but all three have to be read to be sure of obtaining a complete description. Not all the firebacks have an entry in the appendix. This, spelled out, seems complicated, but in practice it works, and for anyone researching a particular item, it is a small price to pay. Apart from this, the book, published by the author, is produced to a high standard. There is a good index, and the price is reasonable.

David Crossley

**Monk Bridge Ironworks** by Glyn Davies, Mark Stenton, Ron Fitzgerald and Rob Kinchin-Smith. *York Archaeological Trust, York, 2011, A4, 194pp, 30 figs, 119 B&W and colour plates, 8 tables, index, ISBN 978-1-874454-56-4, h/b, £20.00.*

ArcHeritage have produced this handsome volume to describe works undertaken by ARCUS in 2006–7 in advance of redevelopment of the Monk Bridge works, just one kilometre from Leeds city centre, for new office buildings. This followed the relocation of the activities of Doncasters Group Ltd to their other sites in 2005 and marked the end of 154 years of metallurgical and engineering work on the site.

The initial phase of development was by Stephen Witham in 1851 and was dedicated to the production of quality boiler plate and rolled sections, although by 1853 his company was listed as ‘steam engine builders, boiler makers and hydraulic press manufacturers’. The works consisted of two puddling sheds and a large rolling mill, together with various ancillary buildings.

Witham retired and sold the works in 1854 to James Kitson, who purchased the works in part to provide his business with a reliable source of ‘Best Yorkshire’ iron and in part to provide a site on which to develop specialised facilities for producing high quality forgings for locomotive axles, tyres and draw-gear. Kitsons built a large tyre mill on the western part of the site and the manufacturing of railway tyres was one of the most innovative aspects of the works. By the mid-1860s Kitsons expanded the works with the construction of a steel-making plant, the ‘Steel Side’, outside the investigated area. Detailed descriptions of the works in the 1880s describe a well-integrated operation, in which pig iron from the Kitsons’ White Horse Ironworks was brought to the site for first refining and then puddling. Great use was made of Siemens gas

furnaces for reheating, particularly in the production of large welded slabs for rolling and forging, including the manufacture of wheels employing steel tyres. After the First World War the railway business declined and the Monk Bridge Iron and Steel Company went into liquidation in 1942, after which the works were operated by the Ministry of Supply.

The final phase of the works started in 1951 when the site was sold to Daniel Doncaster and Sons, later the Doncaster Group Ltd, manufacturers of tools and components for the automotive and aircraft industry. The main products at Monk Bridge were jet turbine blades, including those used in the Rolls Royce Olympus Concorde engines. By 2005 the work was transferred to other sites in the group and the site became redundant.

This long history of industrial development and redevelopment created significant problems for the investigation of the site. The standing buildings recording identified a few remaining structures from the earlier history of the site, but most buildings were from the last, Doncaster, phase. Once the standing buildings had been cleared, the archaeological investigation of the buried remains focussed instead on the earlier Witham and Kitson phases. A phase of evaluation excavations was followed by detailed excavation of specific areas and finally a ‘strip and record’ exercise across the majority of the footprint of the former buildings. These various investigations, together with documentary and cartographic research, provide the material for this book, which deals mainly with the period up until 1942.

The volume provides an excellent account of the documentary evidence for the various companies involved in this site and sets them within the context of the development of the nationally-significant engineering, and particularly railway, industries in Leeds. The overall approach is that of a typical archaeological excavation monograph, focusing on the presentation of data and not straying far into consideration of broader questions. The integration of archaeological information, however, within this synthesis is at times somewhat uneasy. This is reflected in the length of Chapter 6, the discussion, which occupies just four of the 182 pages in the volume. There is no doubt that the archaeology ‘fleshed-out’ the bare bones of the ground-plans of the various buildings on the site, but what additional detail did it provide?

The discussion centres around three detailed aspects of the site: puddling, gas regenerative furnaces and engineering. The varieties of the puddling process in the mid-19<sup>th</sup> century were diverse—as were their products.

The important parts of a puddling furnace were, however, raised well above ground level — and therefore the ground plan, as revealed by excavation of truncated remains, provides little indication of the detailed process or product. The gas regenerative furnaces were represented by several subterranean gas regenerators, but these lacked any evidence for the associated furnaces (although their locations indicated they were reheating furnaces). On the engineering side, some subdivision of the tyre mill was possible on the basis of the archaeological remains, into a northern area for the heavy forging operations of the initial stages of tyre blank manufacture and a southern structure with a single regenerative reheating furnace and a large hydraulic machine for rolling the forged tyres to their finished diameter. Once again, however, the interpretation of the features found during excavation was hampered by the persistent problems of identifying industrial machinery from sub-floor mountings and footings. I suspect that the single most important outcome from the archaeological work was the structural study of the gas regenerators — and the recognition that they were all probably initially constructed as early as about 1860.

This reflects the challenge for the development-lead investigation of ‘brown-field’ industrial sites: how can field archaeology contribute to the overall outcome, particularly within the field of archaeometallurgy? The problems are clear: removal of the above-ground structures of furnaces and other machinery during demolition or reconstruction, the ‘unhelpful’ nature of most machine bases/mountings, the lack of opportunity for the incorporation of raw materials, typical process residues or products into contemporary deposits and the inability of the archaeology to resolve features to the same fine timescale as that of the rapidly changing technology and evolving company histories evidenced by the documentary record. Whilst our ability to interpret and understand industrial complexes will no doubt improve as more sites are given such detailed treatment, the solutions for enhancing understanding of the technical developments of the recent past by archaeological means are far less obvious. As with the more distant past, it seems likely that major enhancements of understanding will come from detailed investigation of those rare examples of simpler, perhaps single process sites, short lived sites and sites with exceptional preservation.

These constraints on the archaeological investigation of metallurgical processes of the recent past are increas-

ingly recognised and perhaps, to some extent, reflect the increased demands of the more subtle and complex questions that we are now asking. Within these constraints, the ‘Monk Bridge Ironworks’ is an excellent volume. The level of investigation of the documentary, cartographic and artistic sources is exemplary and should set the standard for such investigations. If the outcome of the archaeological investigation was less immediately fruitful, that is not a criticism of the fieldwork or of the publication, but is an indication of the severe challenges presented by the archaeology of recent heavy industry. The end result leans very heavily on the documentary evidence and it is perhaps salutary to consider what archaeological investigation of a site of this scale and complexity would have been without that written record. It is to be hoped that curatorial archaeologists will appreciate this and require historical studies as an absolutely essential component of planning-related archaeology on industrial sites. Archaeological mitigation on its own on a site like this would have been a deeply unsatisfactory strategy. It will only be through thorough investigation and publication of industrial sites, in the manner of the project described in this volume, that the methodology for the investigation of such complex sites will evolve and improve in coming years.

Tim Young

**The industrial heart of old Middlesbrough** by John K Harrison. *Cleveland Industrial Archaeology Society (Research Report 10)*, Middlesbrough, 2011, A4, 96pp, 74 figs, ISBN 978-0-905728-07-0, £10, p/b (available by post for £12 from Mr T T Hay, Grindstone Garth, Dalton, Richmond, DL11 7HX).

This book details the construction of coal-loading wharves on the south bank of the river Tees in 1830 and the subsequent development to the east of them, on the northern edge of the new town of Middlesbrough, of industrial enterprises. The initial works were a shipyard and a pottery, but following on from these in 1840 Henry Bolckow and John Vaughan bought a large adjacent area on which to build a puddling and rolling plant for producing wrought iron bars and plates. Blast furnaces to smelt the ironstone from Eston, a few miles to the east, followed in the early 1850s, and by 1863 there were 68 puddling furnaces in operation making Middlesbrough a notable malleable iron producer. In addition there was a large-scale capacity for making castings, such as cast iron pipes for water mains.

Justine Bayley