

HMSNEWS

Historical Metallurgy Society

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Spring 2002

Forthcoming events

HMS Annual Spring General Meeting and AGM 2002 will be held on **Saturday 11th May at Ironbridge**. A two day event with presentations on *Structural Metalwork*. Field trips on the Sunday - see separate leaflet already sent out. Anyone wishing to present a paper, contact Paul Bedford Ironbridge Gorge Museum Trust. (tel 01952 432141).

HMS Annual Conference 2002 13-15 September (starting Friday evening) on **Iron in the Weald**. Members will stay at Seaford (which has a railway station with half hourly trains from London Victoria, change at Lewes.) Full board £85 per person. Our hosts will be the Wealden Iron Research Group, and Jeremy Hodgkinson will outline the bloomery and blast furnace activity that took place in the region. The operating experiences gained on the experimental bloomery furnace operated by WIRG will be reviewed by Brian Herbert and Tim Smith. A demonstration smelt is planned for Sunday afternoon. There will be a coach trip to the Anne of Cleves Museum in Lewes for the famous Every collection of Ironwork, Newbridge (the site of the earliest blast furnace in Britain) and Wadhurst (iron grave slabs). This promises to be an exceptionally interesting meeting and an opportunity for long standing members to renew acquaintance with the Weald on a new basis. Leaflet available, if you have not already received one contact Tim Smith, 15 Hazelwood Road, Partridge Green, Horsham, RH13 SEX Tel (0) 1403 710148.

Finds Research Group 700 - 1700 'Getting more for your money : coins for archaeologists' Colchester Castle Museum Monday 10th June. Anglo-Saxon, medieval and post-medieval coinage, and how they should be published. For further

information contact Philip Wise, Museum Resource Centre, 14 Ryegate Road, Colchester C01 1YG. Tel. 0126 282928. e-mail: philip.wise@colchester.gov.uk

International Seminar on the Conservation and Restoration of Arms and Armour. Oct. 23-25th 2002. Malta. For further particulars see HMSNews No. 49 or contact Robert Smith, Royal Armouries, Armouries Drive, Leeds, LS10 1LT. Tel . +44 (0) 113220 1920. E-mail : robert.smith@armouries.org.uk

ARCHAEOLOGICAL METALLURGY

Archaeometallurgical research in Britain - new guidance document

Members of the Archaeology Committee of HMS will be organizing the production of a document summarizing past research and suggesting future priorities in ancient metallurgy. The idea was stimulated by English Heritage's Regional Frameworks initiative, which aims to set priorities for archaeological research within their English regional groups. If we can feed into these it should help ensure that the remains of ancient metallurgy are appropriately considered when conditions are imposed on construction projects in the planning process. However, rather than being restricted to England, the committee plans to extend coverage to Scotland and Wales. A core of people from the Archaeology Committee (Justine Bayley, Gill Juleff, David Cranstone, Peter Northover, Vanessa Fell and David Starley) will draw together the views of a much larger tier of informants. The framework for this consultation will be decided very shortly, with a target date for "final" presentation at the 2003 HMS AGM. Publication would be in the form of a supplementary volume to the society's journal.

Excavation of a Sheffield cutlery and tool making site

ARCUS carried out excavations during November and December 2001 in Sheffield City Centre on the site of the former **Suffolk Works**, prior to its redevelopment as a car park. In 1834 the firm of Thomas Turner and Sons (knife, steel and tool manufacturers), moved to the purpose-built Suffolk Road site from Norfolk Street in Sheffield. The site had previously been unoccupied, and the development of the site provided the impetus for

substantial development in this area of the city centre.

The excavations, directed for ARCUS by **Richard O'Neill**, revealed substantial structural remains relating to the Suffolk Works, including a 12-hole crucible furnace, grinding workshops, and numerous other floors and foundations associated with forges, file manufactories and warehouses. The structures formed a range of buildings around a central courtyard. Stratified artefacts recovered from the site included thousands of unfinished table knife blades, in addition to pocket knives, files, ingot moulds, crucible vessels and slag. It is hoped that further analysis of the finds from the site and comparison with other excavated industrial sites in the city centre, will further the understanding of the social and industrial history of Sheffield.

Historic Sheffield Steel

Research on historic Sheffield steel is currently underway at the **University of Sheffield**. **Rod Mackenzie's** postgraduate research project aims to combine historical, archaeological and analytical evidence to give a more detailed understanding of pre-Bessemer Sheffield steel and steelmaking.

Archaeological material from recent excavations in Sheffield, together with provenanced artefacts from museum and private collections are being analysed. The analyses concentrate on characterising slag inclusions in the metal at each stage of the production sequence; from the raw material (Swedish wrought iron), to the converted product (blister steel) and the finished artefacts, (shear steel). The results will aid identification of steel in unprovenanced artefacts.

A further aim of the project is to build up a reference collection of 18th and 19th century steel making slags for the University of Sheffield archaeology department. If you have any slag that you would be willing to donate please contact: R-Mackenzie@sheffield.ac.uk or at the University of Sheffield, Research School of Archaeological Science, West Court, 2 Mappin Street, Sheffield, S1 4DT.

Bronze Age copper mining find in North Wales

A submission to the email discussion list, BRITARCH reported that cavers had found a 3,500-year-old Bronze Age chamber at the **Great Orme**

Copper Mines in Llandudno. The find was made by the mine's manager **Nick Jowett** and **Patrick Hammond**. The floor of the chamber was scattered with animal bone and stone tools, including eight to ten stone hammers. It was reported that dozens of tunnels lead away from the chamber, which it was estimated will take three or four years to excavate, survey and record.

Late Bronze Age metalworking debris from Scotland

Trevor Cowie of the **Department of Archaeology, National Museums of Scotland** has provided news of an unexpected discovery at **Galmisdale, Isle of Eigg**.

In the course of burying a cat near a prominent boulder, one of the islanders had encountered fragments of clay piece-moulds, crucibles and other associated casting debris. In Spring 2001, the find was reported to members of a team from the Royal Commission on the Ancient & Historical Monuments of Scotland, who were engaged on a field survey of the island. On their return to Edinburgh, the RCAHMS team brought the finds to the attention of the NMS, where their initial identification and the late Bronze Age date of the material was confirmed and the potential importance of the discovery was underlined. The character of the clay refractory material and the metal types that were manufactured indicate a date for this activity between about 1000 and 800 BC.

Exploratory fieldwork was undertaken to assess the original context of the finds. Surface indications, coupled with the finder's account of his own excavation, initially suggested that the metalworking activity might have been taking place within an oval setting of large boulders. In the event, it was found that the boulder structure was later than the metalworking episode, and probably represents the construction of a small pen or shelter in the course of agricultural activity on the hillside. However, the largest of the boulders, which drew the finder to the spot initially, was clearly an original feature of the terrace on which the site lay and would undoubtedly have been a distinctive feature of the terrace when the metalworking was taking place. For the moment, it seems that the metalworking episode at the site may have been small-scale and short-lived, and possibly unmarked by any formal built structure.

Together with clarification of the various phases of human activity in the immediate vicinity of the boulder, the detection and excavation of any remaining undisturbed portions of the actual locus of the metal-working are the chief priorities for further work planned for 2002. Between the need to find a suitable place to bury the cat and an unusually observant finder, serendipity has provided an exceptional opportunity to investigate a site that in normal circumstances would have defied discovery.

Ironworks web site

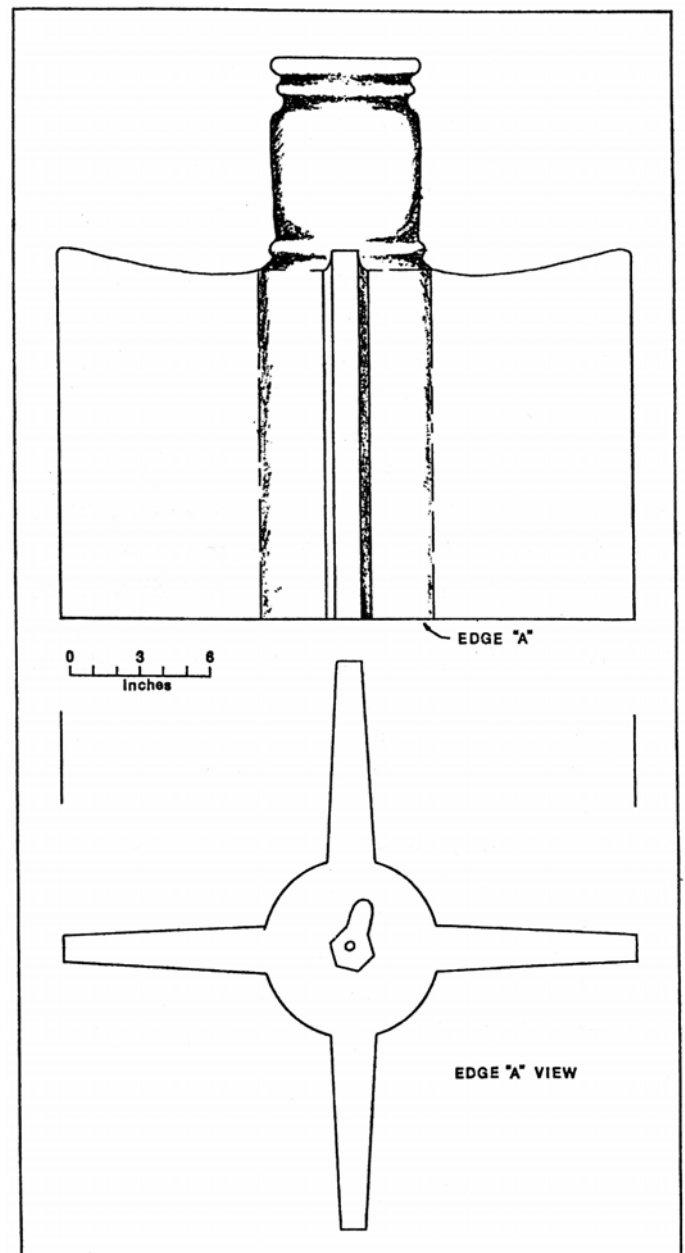
For those with internet access, **Jeremy Greenwood** has written to say that he has prepared a draft article on the Sowley (Hants.) ironworks at www.hants.gov.uk/newforesthistor/ironsowl/htm. Comments from HMS members would be welcome.

Help needed to identify iron object

Gordon Pollard at the **State University of New York** would like help in identifying a heavy cast iron artefact which came to light during the 2001 excavations at a 19th century bloomery forge site (1830–1890) adjacent to a river in the **Adirondacks** up upstate New York. They have so far been unable to identify its function. It was found standing in the corner of what is interpreted as a blacksmith's work space that lies between the smith's forge and a long row of 16 bloomery forges used for the reduction of iron ore. Other operations and facilities in the building included waterwheels that operated heavy trip hammers for shaping the reduced lumps of iron into billets, and a waterwheel and bellows unit in attached structures at each end of the 15.8m x 71.3m forge building.

The mystery artefact is of solid cast iron, with an estimated weight of over 90kg. Its orientation in the drawing may not correspond to how it was positioned as part of some mechanical operation, and it seems to have been discarded to the spot where it was uncovered. Its measurements are as follows: overall "height" is 635mm, and the total length of edge "A" is also 635mm. There are four tapered blades, each 406mm "tall," and 212mm "wide" (two of these had portions of their "upper" outer corners broken off). There is no sign of anything having been attached to the blades. Each blade is 32mm thick at the outer edge, and 50mm thick at its junction with the central shaft, which has a diameter of 190mm. The projecting "hub" end is 162mm in diameter and extends 229mm, with heavy

rotational wear in the two constrictions at the outer end. The hub has a slight reduction in diameter toward the blade-bearing shaft. The end at edge "A" has a hexagon opening that is 148mm across with a 32mm oval extension at one side of the hexagon. A rod or shaft of that shape had originally been inserted into the opening, and had broken off flush with that end of the unit. A 13mm diameter, off-centre depression, 10mm deep, in the broken off rod appears to be an aborted attempt to drill into the broken piece.



The Mystery artefact.

Any assistance in identifying the original function or configuration of this artefact would be greatly appreciated. The iron works, of which the forge building was one part, at various times included an ore separating facility, and a kilometre away a rolling mill, a saw mill, a grist mill, and a nail factory. Waterwheels, and one known water turbine at the distant rolling mill, were the sources of power. The parts of the one known water turbine bear no resemblance to the mystery artefact described here.

Dr. Gordon Pollard, Prof. & Chair of Anthropology, State University of New York, 101 Broad Street, Plattsburgh, New York 12901
gordon.pollard@plattsburgh.edu

New conservation publication

David Scott's latest book; **Copper and Bronze in Art - Corrosion, Colorants, Conservation** is now available, published by the Getty Conservation Institute.

Any contributions to next issue by 31st May to: David Starley, Royal Armouries, Armouries Drive, Leeds LS10 1LT. UK. Tel. (0113) 2201919, Fax (0113) 220 1917,
Email david.starley@armouries.org.uk

We have the two following contributions from Ironbridge. Members may like to know that on 20-21 July National Archaeology Day there will be an weekend excavation at Blists Hill, Ironbridge.

Wednesbury Forge, Wednesbury, West Midlands.

In December 2001 **Ironbridge Archaeology**, led by **Paul Bedford**, undertook a desk based assessment of Wednesbury Forge, in the West Midlands. The site, which is presently the location of Spear and Jackson manufacturing operations, was found to date back to the sixteenth century. Water power was harnessed for a finery and chafery in the early seventeenth century, and the forge was absorbed into the Foley partnership in the late 1600s. Possibly the scene of early experiments with mineral fuels, the site was further expanded by the Willetts concern in the eighteenth century for the manufacture of saws and gun barrels. In 1817 the forge was taken over by the edge tool maker Edward Elwell, whose descendants operated the site until the late twentieth century. Despite later landscape modifications, it is clear that elements of the earlier parts of the site are

well preserved. An extensive programme of field evaluation of the site will be undertaken in the Spring, and it is expected that significant deposits relating to the processes in use on the site will be encountered, with the recovery of metallurgical samples a priority.

The Iron Bridge, Shropshire

In January the BBC broadcast a programme about the Iron Bridge and its construction; this followed on from an extended project of archaeology undertaken by Shelley White of Ironbridge Archaeology on behalf of English Heritage. The archaeological recording revealed a great deal of new information about the construction of the bridge, much of which can be linked to known historical information. The archaeological data was used by Bill Blake of English Heritage to create a 3D CAD model of the bridge showing its construction and alterations to the fabric; this will be used as a management tool for future conservation. A detailed report on the work done by Ironbridge Archaeology will shortly appear in Historical Metallurgy.

BOOK REVIEWS

Many of our long standing members will well remember Tortsen Berg and his attendance at our conferences. It is a great pleasure to see the considerable work he started finally seeing the light of day - thanks to his son Peter who completed the translation. This book was reviewed in the last HMS Journal, by P. W. King, but since this review covers many different aspects I felt that members would welcome its inclusion in the News.

Editor

RR Angerstein's Illustrated Travel Diary, 1753-1755

Furnaces to cucumbers - The illustrated travels of a Swede in Britain 1753-55

In 1753, the Swedish engineer, Reinhold Rucker Angerstein spent two years journeying through England and the Welsh borders to assess the Nation's development in matters of technology, engineering and agriculture.

Financed partly by the Swedish Government, partly by the present day Swedish Iron Producers Association (Jemkontoret) and partly by private companies, he was one of at least 20 Swedish engineers who visited Britain in the 18th and 19 centuries to ascertain the market for Swedish bar iron in Britain and the technological competence of the country's iron industry in competing with Sweden's. The demand for iron by Britain grew rapidly in the 18th Century as the Industrial Revolution took hold, and over half of this iron was supplied by Sweden. In 1699, Swedish exports of iron to Britain amounted to 15.3kt, accounting for half of all Swedish iron exports and 80% of Britain's iron imports. By the time of Angerstein's visit, imports of Swedish iron had increased in volume to 24.5kt - nearly 60% of Sweden's total exports - but this now only supplied 64% of Britain's needs, the remainder being produced domestically or imported largely from Russia and to a lesser extent from Spain and America. In fact, by 1767, iron imports from Russia exceeded those from Sweden, which was never again the dominant supplier.

This awareness of the highly competitive nature of the trade in iron is reflected in many of Angerstein's diary entries where, in each region of the country he visited, he compares the prices of imported iron and locally produced iron. The latter provides an invaluable insight into British ironmaking as it not only includes the prices of raw materials but also the wages paid to the different categories of workers.

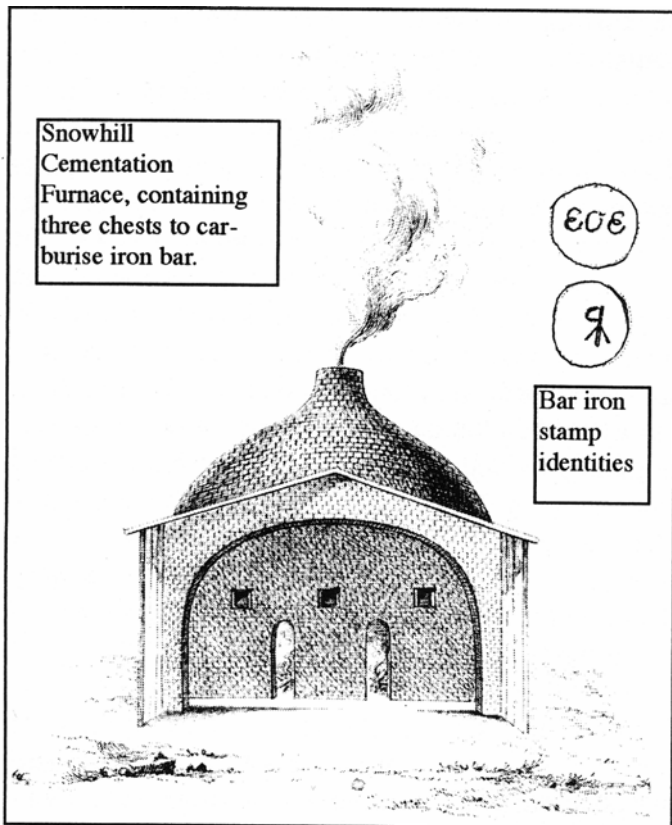
A very revealing conclusion is that the production costs of British iron were twice those of Swedish. For example, he quotes the selling price of Swedish bar iron at forges in Värmland as £9–15 per ton and the price of the same iron sold in Britain as £18, which was still less than that of locally produced iron which was also inferior in quality - at least as far as steel-making was concerned. He puts much of the higher cost of production in Britain down to the high cost of charcoal — ten to 15 times more expensive than in Sweden — and chastises the British for not planting more trees and managing their forests better. Surprisingly, although coke had been introduced for ironmaking in Britain some 45 years earlier (1709 by Abraham Darby 1st), he reports on only two blast furnaces using coke — that of Abraham Darby's in Coalbrookdale and the Clifton Blast furnace near Workington in NW England. He records that iron made from coke was

more expensive than that made from charcoal and that while it was suitable for making castings, it was unsuitable for fining to bar iron, commenting that the cause was more related to the refusal of the smiths to adopt new habits in fining, than to the iron itself. The higher cost of coke produced iron was attributed to a high wastage of coal on coking in 'beehive' piles and the lower productivity from the coke blast furnace, for example only 12–13t of iron per week was produced when fired with coke compared with 18–19t when charcoal was used. He does, however, comment on the use of 'mineral' coal in fining hearths (to produce low carbon bar iron from pig iron) and comments on the exceptional cost saving this provided, the cost of fuel per ton of refined iron dropping 92% from £3–15s (£3.75) when using charcoal to 6s (£0.3) when using coke. (However this was before the time of Cort and his reverberatory puddling furnace of 1784 so quality would have been compromised).

On his visit to Coalbrookdale he witnessed the wide range of artefacts cast and the cheapness of these, and here demonstrates his technical prowess when witnessing workmen filling cavities in the castings with copper, commenting (in his diary — not to the work-men) that placing burning coals on top of the casting head would have ensured better feeding during solidification. The boring of cylinders for Newcomen steam engines is illustrated and described — but some of the workmen evidently had a joke at Angerstein's expense as he refers to a cylinder being cast for an engine in Redruth (for the Cornish tin mines) as being large enough for a man to ride his horse through — in fact even the largest cylinders did not exceed 90 inches.

Not surprisingly, there is no reference to the world famous cast iron bridge at Coalbrookdale since this was not to be built until 1777.

Much of the Swedish bar iron was converted to steel by recarburising it in cementation furnaces. Here he faithfully records local preferences in operation, for example, the chests were packed with charcoal made from juniper in one location, while oak was preferred in another. He comments on the preference to use Swedish iron from the Dannemora region for steel-making and rightly identifies the higher concentration of manganese in this iron as being beneficial in the cementation process.



Angerstein was not always welcome by the owners of the works he visited and sometimes resorted to bribing workmen to gain access. He spent less than 24 hours in Sheffield where his keen interest in Huntsman's crucible steelmaking process was such that he was warned to leave the City. However, he succeeded in visiting eight of the 10 tinplate works then operating in Britain following the perfection of the process by Major John Hanbury in 1728; Angerstein's interest in tinplate was no doubt to report back to one of his private backers, Jennings and Finley, who had unsuccessfully tried to establish a tinworks in Sweden.

While there are some 83 references relating to iron in the diaries — some running to several pages — Angerstein records almost everything he found of interests. There are many entries on mining, from the tin and copper mines of Cornwall, to the lead mines of Derbyshire and Cumbria. Numerous entries describe coal mining and include a sketch of a 'spark' machine to give light underground without the 'risk' of igniting firedamp (methane), which a naked flame was known to do. Comments on society are also sometimes included, from the Cornish 'hags' smoking pipes, to the fear of highwaymen on his travels and the sight of gallows along the road to deter them.

But also scattered among the dominant entries on engineering topics are comments on agriculture — the type of crops grown, the merits of marl over lime in fertilising fields — and even recipes, for example how to pickle cucumbers.

The translation of the book into English was evidently a labour of love. Commenced by Torsten Berg, the task was completed on his death by his son Peter. The English is excellent, the only possible confusion being the frequent reference to 'coal' instead of 'charcoal', but the distinction is made clear by the use of the term 'mineral coal' wherever the fossil fuel is referred to. The 378 page book includes some 360 sketches redrawn at the time from Angerstein's original daybooks. These in themselves provide superb detail of many of the structures and equipment.

Each of the six journeys undertaken are recorded as separate chapters liberally annotated with comments by the editors. There are also 10 pages of introductory text, three appendices listing source materials, iron identification stamps and details of translation methods and weights, measures and currency conversions. There are also 38 bibliography references and an excellent index.

The book provides one of the most comprehensive records of industry and life in Britain in the mid 18th century available today. While this is a bonus for British readers, the descriptions of the technologies employed are relevant throughout Europe and beyond. Indeed, after leaving England, Angerstein travelled for a further six months through Belgium and Holland. So perhaps there are further archives held by Jemkontoret ripe for publication.

RR Angerstein's Illustrated Travel Diary, 1753-1755, Translated by Torsten & Peter Berg is Published by the Science Museum, London.
 ISBN 1 900747 24 3 (hardback 378pp) Price £34.95.
 (Available from Gazelle Tel +44 (0)1524 68765
www.gazellebooks.co.uk)

Reviewer Tim Smith

Robert Mushet and the Darkhill Ironworks

An illustrated monograph of the work of Robert Mushet in developing alloy steels at Darkhill Ironworks in the Forest of Dean, on the English - Welsh borders, illustrates the secretive nature of the steel industry in the mid 19th century.

Robert Mushet was a contemporary of Henry Bessemer and some claim that Bessemer owed much of the commercial success of the Bessemer Converter to Mushet who had recognised that additions of the high manganese ore, spiegeleisen, dramatically lowered the porosity of steel produced by pneumatic processes, as well as removing the harmful effects of any sulphur present. Mushet refused to tell Bessemer the secret of his success — which was in fact a technique already practiced in the foundry industry, and one that Bessemer was soon to discover and improve on himself.

There is no doubt that Mushet was an innovative steel-maker. He was the first to make an air hardening steel, for example, and in 1857 provided the Midland Railway with an experimental steel rail which lasted over 10 years, seven years before Bessemer provided- his first rail at Crewe. The exact process he developed at Darkhill is still unknown but, like others at that time, such as Parry at nearby Ebbw Vale (see STI October 2001, p 49), and Kelly in USA, these processes were either not sufficiently persevered with to bring them to commercial fruition, or the patents bought by Bessemer to safeguard his own work. Regrettably, this monologue concentrates too much on promoting Mushet's work at the expense of ignoring other developments of the time, apart from that of Bessemer, who is somewhat depicted as a 'villain' cheating Mushet out of his due credit. As a description of Mushet's life and the history of the Darkhill Ironworks (established by his father) and the adjacent Titanic steelworks (so called from Mushet's use of titanium in his alloy steels), the book is fine. However, some of the steelmaking chemistry is incorrect — there is also an implication in a caption on p 87 that the Bessemer process is current technology, and the several illustrations of the Abbeydale crucible furnace — included because of Mushet's involvement with Samuel Osborn of Sheffield — are not shown to be relevant to the 'secret' processes attributed to the Titanic steelworks but reflect the much earlier invention in 1740 by Huntsman of crucible steelmaking, in Sheffield.

Reviewer T Smith

Robert Mushet and the Darkhill Ironworks, by Keith Webb, Black Dwarf Publications 2001 ISBN 1 903599 02 4 softback 88 pages 90 illustrations Price £7.99.

LETTERS FROM MEMBERS

Wind Furnaces in Britain.

Thilo Rehren's note in HMS News 49 on reported wind furnaces in the Sudan, brought to mind a couple of references in particular to similar evidence in these islands.

KG. Nichols (1858) in his book 'The Forest of Dean', p 216 deduced their presence by the elevated situation of great heaps of cinders, where furnaces would catch the wind. More specifically, E. Rogers, 'Iron Ores of Great Britain' Geological Survey, 1861, p 165 recorded that 'on the highest points of the Bloreng (A mountain near Abergavenny) large quantities of cinder from the old furnaces are found'. Surprisingly, it does not appear that either has been followed up in the field, but there is every chance that much of interest might be discovered, especially on the Bloreng which has remained practically undisturbed ever since.

David Bick 9.1.2002.

Reminiscences of a Blacksmith.

I left school, at fourteen years of age in 1936, to begin an apprenticeship at Thomas Robinsons makers of wood working and flour milling machinery as a blacksmith.

The six smiths employed in the forge were all in their fifties and sixties and had great difficulty coping with the change from the wrought iron to mild steel. Wrought iron lent itself to fire welding and would stand far greater heat than mild steel, but the latter could be worked at far lower temperatures. When using wrought iron a great amount of the work carried out was fire welding which included collars on shafts, bosses on plates and all shapes of items welded together. All this carried out at a heat that you work the metal like snow, but when forging same under a power hammer the wrought iron must be worked at a welding temperature as if 'puddling'. If the metal dropped below this state it slipped like the effect of hammering wood. If bent, this had to be done at a higher temperature to avoid cracking or breaking.

Mild steel was the opposite, if overheated it would 'burn' and whilst bringing it up to welding heat, we would dip it in sand to cool the outside whilst getting the centre sufficiently hot. The actual heat at

which mild steel could be welded without ‘burning’ was very critical and nothing like the latitude of wrought iron and the older smiths would despair when having what they considered a good weld in mild steel to see a crack appear at the back of the weld due to overheat. In due course profile burning and electric welding took over from the smiths. I was young enough to adapt and start my own company so went from working in metal to buying it and this led to my interest as to how and where smiths and armourers throughout the ages purchased the metal plates and bars that they used and how this plate was manufactured. I can find no evidence of rolling and from my experience I can- not see how they could draw out iron to the required size and thickness. I would be most grateful to hear from anyone with a knowledge of this procedure.

J. Thorneycroft. 1, Lowerfblld Close, Rochdale, Lancs OL12 7HY.

I forwarded Mr Thomeycroft some pages from Schbert's 'History of the British Iron and Steel industry' which I think would answer most of the questions in his mind about the making of plate iron. This was made by hand, beating out bar into plate, until the advent of the slitting mill in the late 16th and early 17th centuries. One of my ancestors Thomas Chetwynd of Rugely operated the first slitting mill in the Midlands in 1622/3. By this time, of course, plate armour had practically passed out of use, so in the great days of the armourers it was all produced by hand. However some of our members may have memories and experiences of their own on these topics.

Editor.

MEMBERS SEEK INFORMATION

Update on Henry Cort

I am following up my book on Fareham's Henry Cort Millennium Project, reported in a previous issue of the HMS newsletter, with research into Cort's life. Emerging evidence suggests that the book commissioned from Peter Singer in 1983 now needs updating. In particular, the publication in 1997 of The Letterbook of Richard Crawshay shows that early problems arose in the adaptation of Cort's puddling process in South Wales, and evidence given to the Parliamentary Inquiry of 1812 should be treated more seriously than most commentators have done. However, most of what I am unearthing is more personal than technical, and therefore inappropriate for regular HMS publications. If anyone has a particular interest in this subject, or can supply information that might be useful, they can contact me at 9a Chestnut Avenue, High Wycombe, Bucks HP11 1DJ, or ring on 01494 439481.

Eric Alexander

Tin Smelting Slags required

Albertine Malham from the University of Bradford has begun a new study of tin smelting slags from Devon and Cornwall ranging from the early medieval period through to the 18th century. The aim is to relate geographical factors and technological changes in the smelting-process to the chemical composition of resultant slags. Initial investigations have been carried out on material from the early medieval Crift Farm site in Cornwall, where a considerable quantity of slag was discovered. A comparison was made between this and slag from a small number of later “blowing house” smelting sites, mainly in Devon, which utilised water-powered technology. The slags were analysed by SEM/EDS and were seen to contain a large proportion of silica, varying between 30–50% by weight in the samples examined. The oxides of tin and iron were also major constituents of the slags; again amounts of each varied from sample to sample: tin oxide content ranging from 7% to 36% and iron oxide from 6% to 21%. In all, concentrations of fourteen oxides were determined and wide variation between samples from different sites was the norm. In order to extend the study, it is necessary to increase the quantity of material sampled. If any HMS member has any tin smelting slag either from reverberatory furnaces or blowing houses (and earlier), and they would be willing to have it analysed, please contact Albertine at the Department of Archaeological Sciences, University of Bradford, Richmond Road, Bradford, BD7 1DP, or e-mail albert@malh.freeseerve.co.uk. Useful results can be obtained even from a single fragment a few millimetres in length.

Albertine Malham

Slag at Meir Heath Stoke-on-Trent.

Andrew Milward is a new member; his family firm of building contractors uncovered a large area of furnace slag at Meir Heath, now built over. He has read the article ‘The North Staffordshire Iron Industry’ in HMS Vol 11 Number I 1977, which gave a lot of information. An iron foundry appears on the 1878 and 1900 maps, but by 1924 it had been closed down and built over, and there is no proof that it was where the slag was found. There appears to be some confusion between the furnace at Meir Heath and a furnace at Normacott. He is still researching the history of both the furnaces and would very much appreciate any help that members might be able to give. Please contact him at:

12 Milward Grove, Meir, Stoke-on-Trent.

The Hon. Editor Amina Chatwin, The Coach House, Parabola Close, Cheltenham GL50 3 AN. Tel 01242 525086 welcomes contributions for HMSNews by, the end of February, June 11th, and November 5th. If possible on Apple Mack or ascii.

Membership Secretary, Mrs Lesley Cowell “Little Gables” 17a Thorncote, Northill, Beds, SG18 9AQ. Direct e-mail address is: lesley@mcowell.flyer.co.uk.