

### A Roman iron smelting settlement at Caergwanaf, Rhondda Cynon Taff, Wales

Tim Young

The rediscovery of a major bloomery iron production site on the banks of the River Ely was first reported in Newsletter 45. Geophysical survey in 2000 had revealed a large slag dump, 80m x 120m, on the river floodplain, which was provisionally interpreted as being of late medieval to early post-medieval date, together with adjacent enclosures on higher ground, also associated with iron-making, which were tentatively identified as being Roman. After a hiatus during the foot-and-mouth disease crisis in 2001, work by Cardiff University resumed on the site in 2002 with two small exploratory excavations, one to examine an area adjacent to one of the supposed late furnaces, and one to investigate one of the possible Roman enclosure ditches. Both excavations demonstrated that the features investigated dated to the 2nd/3rd centuries AD. This discovery prompted further geophysical survey in 2003 and 2004, which produced not only evidence that the Roman settlement and industrial activity extended over approximately 10ha, but also that the iron-making settlement partially overlay an early Roman timber fort. Within the fort is another, parallel, ditched enclosure (Enclosure B on the plan), suggestive of a fortlet for a reduced garrison, such as has been found in many forts in Wales. The ditch examined in 2002 (labelled Enclosure C on the plan), which was apparently dug in the latest 1st or early 2nd century, appears to cross-cut the line of the defences of both the fort and fortlet.

In 2004, the opportunity arose to excavate part of the fort's western defences and gateway. The fort ditches, forming "Parrot's Beak" terminations were located on either side of the gateway, and yielded pottery from a narrow age range of 70/75 to 80/85AD. This confirmed the fort as one of the system constructed during the early Flavian military consolidation in South Wales. The backfill of the fort ditches yielded no certain iron smelting slag (although they did contain smithing slag). A small ditch along the north side of the road emerging from the gateway did, however, yield probable iron smelting slags. The pottery from this ditch does not appear to differ significantly from that of the main fort ditches, but it is possible that this roadside drain

remained in use during the period of the supposed fortlet (which appears to have retained the E-W road of the earlier fort), rather than being backfilled with the abandonment of the fort in the early 80s. In either case, it seems likely that iron smelting had started on the site before the end of the 1st century.

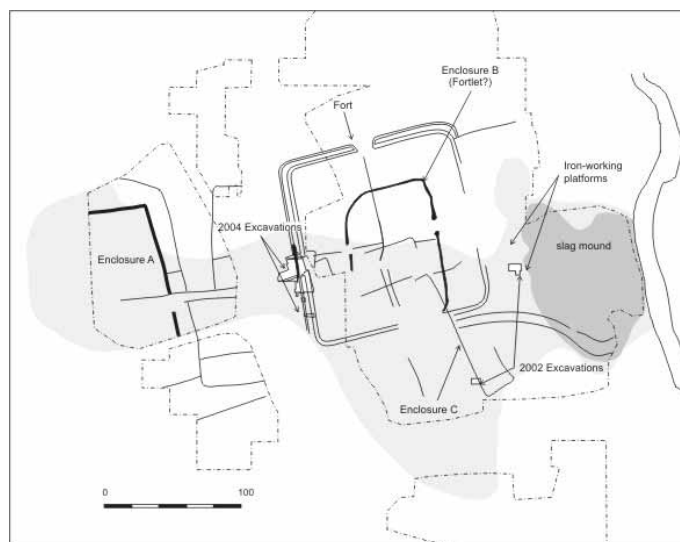


Figure 1. plan of the site at Caergwanaf. Pecked lines indicate the limits of geophysical surveys. Solid lines indicate ditches located by geophysical survey. The pale grey tone shows the extent of the spread of slag and other features, broadly indicating the extent of the 2nd-4th century Roman activity. The darker grey tone indicates the main slag dump.

The major period of iron smelting at Caergwanaf appears to have been from around the start of the 2nd century through until about the middle of the 3rd. During this period, the settlement may have lain within Enclosure C on the hilltop, with much of the metalworking concentrated on working platforms just above the level of the floodplain. The area excavated in 2002 around the geophysical anomalies interpreted as furnaces, produced evidence that working platforms were terraced into the hillside, rather like those at Sherracombe Ford investigated by the Exmoor Iron Project. The earliest phase in the area examined in 2002 appears to have included furnaces, but these were buried under the waste (including slag, charcoal and ore) associated with a higher floor, the latest phase of which was used for smithing. The large slag dump below the working platforms has been estimated to contain approximately 10,000 tonnes of slag.

Evidence from the areas excavated in 2002 suggested that the smelting activity had ceased by the mid 3rd century, and in the area excavated in 2004 new ditches dug in the late 3rd century were indicative of continued occupation of the site into the 4th century, possibly associated with the poorly known large enclosure, Enclosure A, to the west of the site. There is no evidence, however, that this

late occupation phase was associated with iron production.

The evidence from Caergwanaf is indicative of the production of iron on the same scale as that at some of the major sites of the Weald and East Midlands. The full significance of the site will only be established with further investigation, but taken together with the emerging evidence from Exmoor, demonstrates a much higher production of iron from around the Bristol Channel area than had previously been suspected for the Roman period.

Further details of the project may be found at <http://www.geoarch.co.uk/cgu/index.html>

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## When is a stone mining hammer not a mining hammer?

*Paul Craddock*

The ubiquitous evidence of early mining around the world are the stone mining hammers. The excavations in Britain and Ireland of early mines has established that they were used exclusively during the Bronze Age. Brenda Craddock has shown how they are likely to have been hafted (Craddock *et al.* 2003) and John Pickin (1990) and Simon Timberlake (2005) have attempted to classify them. Some seem to bear no evidence of hafting, some have central notching, while others, notably at Ross Island in Ireland and Alderley Edge in England have a meridional groove.

But are they all necessarily mining hammers?

The question is raised by the odd grooved stone found in the Bronze Age tip material filling the Pot shaft of Roman date at Alderley Edge (Figures 1 and 2). It is a coarse, rather crumbly basalt brought into Cheshire from the Lake District almost certainly as a glacial erratic. Its groove is only partial but is definitely deliberate. It is described by Timberlake (2005, 68) as being unique in form and at 16kg is by far the heaviest worked stone found at Alderley Edge. Timberlake speculates that it could not have been hafted in the usual manner but instead could have been suspended from a cradle and swung against the rock face as is envisaged for some of the heavy hammers found at the Great Orme mine in North Wales. However, the latter are heavily battered at their ends, but the Alderley Edge stone is not. It is generally bruised but with no evidence of battering at the ends.



Figure 1. Large grooved stone from the Pot shaft, Alderley Edge, Cheshire (Manchester Museum Accession no 1998.51; PS 26).

(Photo: T. Springett/British Museum)

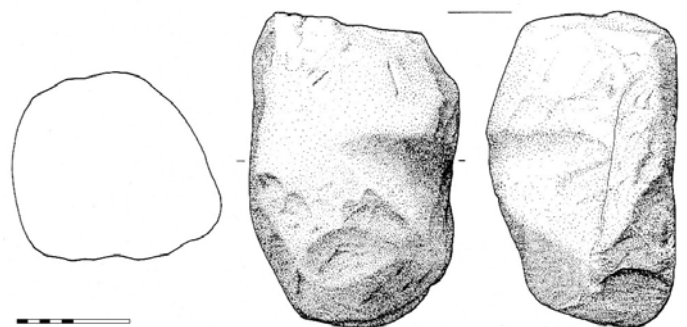


Figure 2. Large grooved stone from the Pot shaft, Alderley Edge, Cheshire (Manchester Museum Accession no 1998.51; PS 26). (Brenda Craddock)

If it is indeed of the Bronze Age but not a mining hammer, then what could it be? Many years ago when the Chinese began investigating the ancient copper mine at Tonglūshan in Hubei province (Anon 1990) they found many grooved stones which they interpreted as being counter weights to help in raising the ore (Figure 3). This interpretation seems eminently unlikely at Tonglūshan

and is even more unlikely in the relatively shallow workings at Alderley Edge.

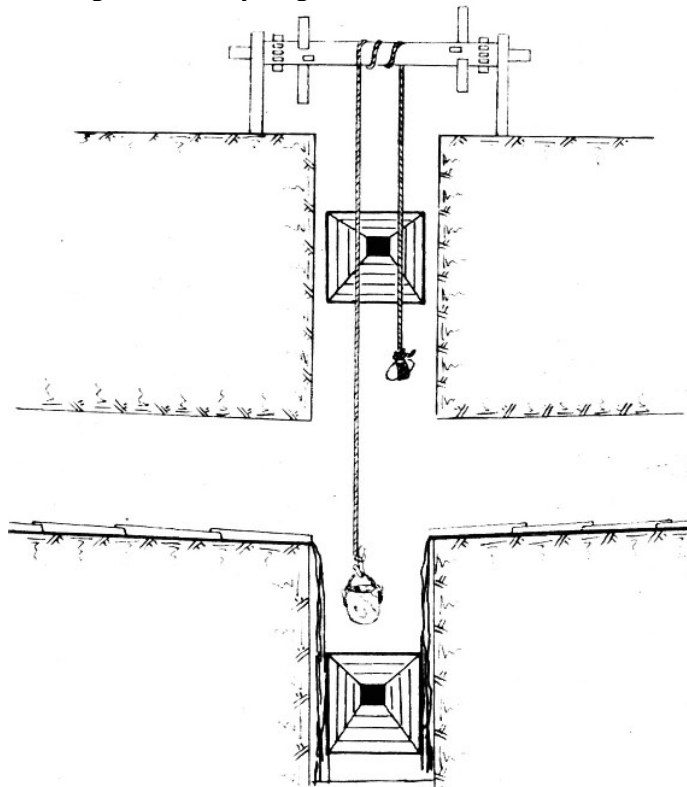


Figure 3. The Chinese envisaged that the numerous grooved stones found at the ancient copper mine at Tonglūshan were counterweights to help raise the ore as depicted here. (Anon 1980)

Some years ago when the prehistoric origins of the Alderley Edge mines was still doubted it was suggested that the grooved stones were no more than thatch or tent weights. The evidence of heavy wear on the ends of most of the stones strongly suggests that they really were used as hammers, but could this have been the function of PS26, which is so different from all the others?

If it was a weight for holding down a temporary structure, what could have been its function? Two possibilities spring to mind. It could have been a cap over the pit currently being worked to keep the weather out and to stop flooding. Such conical structures are regularly depicted on Post Medieval European mines. Alternatively the stone could have helped to secure some temporary accommodation for the miners. The subject of the basis on which the mines were worked is very uncertain, but it is quite possible that mining was a seasonal activity requiring temporary shelters rather than permanent structures. In which case PS26 might be significant evidence for them.

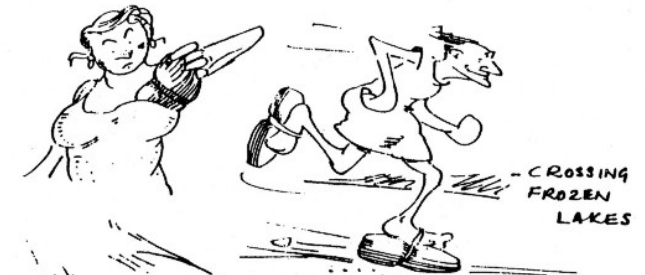
Perhaps our interpretations of the grooved stones is generally too restrictive. John Pickin's (1990) eminently plausible alternatives, some of which are reproduced here have never received the serious consideration they deserve (Figure 4).

GROOVED STONE MAULS —  
THE ULTIMATE, MULTI-PURPOSE BRONZE AGE TOOL  
THESE IMPLEMENTS WERE USED FOR MORE THAN  
JUST SIMPLE METAL MINING :

— AS BODY ORNAMENTS



— FEMALE IMPERSONATION



— AND FOR USE  
AS NATTY DOOR  
KNOCKERS

Cartoon by John Pickin

Figure 4. John Pickin's suggested alternative uses for stone hammers. (Pickin 1990)

## References

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## A storm in an eggcup: enigmatic objects from Broom Quarry, Bedfordshire

Roger Doonan

Recent excavations at Broom Quarry, Bedfordshire, undertaken by Cambridge University Unit, have recovered fragmentary remains of Iron Age metalworking. From one context in a pit approximately 6kg of slag was recovered which included smithing hearth bottoms, nodular slags and thin plate slags. Accompanying this were two lumps of iron mineral, numerous fragments of broken copper alloy artefacts, a complete crucible and over forty other crucible fragments which had been used for melting leaded tin bronze. All fairly normal for an assemblage of this date, however, some objects are more enigmatic and it is tempting to think that they are related to metalworking.



Figure 1. The 'egg cups' from Broom Quarry



Figure 2. Crucible on 'egg cup' (both were recovered from same context)

Figure 1 shows a collection of four ceramic objects from this same context. Referred to as 'egg cups' by the excavators their function has not yet been explained, apart from the possibility of them being used by an

ovivorous smith. The pedestal-like objects are approximately 50mm high with a flaring base and a bulbous upper terminal. Where extant this upper terminal has a neatly formed depression with undercutting tapering sides. The ceramic fabric is similar to other fragments of slagged and/or vitrified ceramic found in the same context. They appear to have contained organic temper and were fired rather rapidly.

Figure 2 shows one of the pedestals supporting a crucible found in the same context; the association is tempting but a purely speculative one although there are examples of crucibles with integral pedestals (e.g. Aegean Bronze Age). They are vaguely suggestive of stands used in salt-making such as those found at Poole harbour but those tend to be crudely made and exhibit a characteristic twist.

Intriguingly, a similar object has been found at Silchester (see Figure 3). The excavation team at Silchester have also christened their find an 'egg cup' whilst attesting to its enigmatic nature. They are both intriguing and frustrating inasmuch that they might be an unrecognised element of a metallurgical assemblage but it is unlikely their function will ever be determined exactly; a bit of a curates egg really! Any suggestions as to their purpose would be gratefully received.



Figure 3. 'Egg cup' from the recent excavations at Silchester (thanks to Mike Fulford)

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## B O O K R E V I E W

Hayman, R 2005 *Ironmaking. The History and Archaeology of the Iron Industry*. Stroud: Tempus

Tempus continue to publish inexpensive and accessible books on a range of subjects, and one of the recent additions will be of particular interest to members of the Society. The author will be known to many for his work at Ironbridge and in Wales. Some of his research on 'potting and stamping' has already been published in *Historical Metallurgy* **38**, 113–120.

The book includes chapters on bloomery smelting, the charcoal blast furnace and finery, the introduction of coke smelting, puddling, and the 19th century in chronological order. In addition, there are chapters which cover ironmasters and iron workers and a final chapter on the conservation of surviving buildings and monuments.

Hayman sets out to 'challenge some of the prevailing notions' and in particular the idea of a linear model of technological development in which the central role is occupied by the ironmasters. He argues persuasively that the first historians of the iron industry (writing in the 19th century) projected their circumstances onto the 18th century. Hayman suggests that technological change was gradual rather than dramatic and that much of the change originated with ordinary workers who would not have had the money to obtain patents, 'The ironmasters whose names appear on the patents brokered the new technology and hoped to profit from it, but they were not necessarily the originators of the new processes'. He argues that many of the developments in the iron industry (especially before the 19th century) were techniques rather than technologies.

The first chapter on bloomery smelting is very disappointing and just rehashes out-of-date accounts (e.g. 'bowl' furnaces, Belgic invaders). The subsequent chapters (especially those close to Hayman's doctoral thesis) work much better and provide a concise account which manages to bring together technological, social and economic factors for the mainland British industry. While the book lacks much of the detail found in some other accounts (e.g. Hyde's 1977 *Technological Change*) these either limited in their chronological or geographical coverage or are out of print.

Despite the book's title, there is very little archaeology here; the final chapter 'Archaeology and Conservation' is only really about sites where upstanding remains of the industry have survived.

## Rammelsberg Gold

John Weale

This is the title of a booklet bought at the Rammelsberg Mining Museum, at Goslar in the Harz Mountains, Germany. I have recently finished translating it into English. It was written to promote an interest in the subject, not as a textbook.

It covers briefly the history of techniques used to separate gold from the Rammelsberg ore and the uses to which the gold was put. The Rammelsberg mine operated from the Middle Ages until 1988. The Rammelsberg ore contained silver, lead, copper, sulphur and small quantities of gold. Attempts began in the 16th century with quartation which later proved successful. By 1962 when refining ceased electrolysis had been used for some years.

In the 18th century the rulers of the old German states of Hannover and Braunschweig-Wolfenbüttel claimed the Rammelsberg gold production (only amounting to a few kilograms/year). Commemorative medallions (often featuring mining themes) and coins were produced in the mints at Zellerfeld, Clausthal and Braunschweig. The techniques used in the mints are described briefly while the coins produced for the two states are described in some detail.

Because this period covers the joint monarchy of Britain and Hannover (18th and first part of 19th century) some of the coins have echoes in British coinage. The inscriptions became quite complex and were severely curtailed.

There are 26 pages of text and diagrams covering the history of separation methods and uses of the gold. There are a further 29 pages of appendices detailing separation methods in the form of process flow diagrams, buildings and machinery used in minting, commemorative coins, mintmasters and their signs, figures for gold and silver production from the 16th to the 20th century.

I have to thank Dr. Max Planitz for help with some words and sentences in old German. If any member would like a copy of this translation, then it is available for free as a PDF file on CD ROM from the address below. Also included is a PDF copy of an earlier translation *Historical Rammelsberg*. They can be read using Adobe Acrobat 5 or 6 with Windows.

John Weale

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**David Ewart Bick**  
**BSc, C Eng, MI Mech E, FSA**  
**1929–2006**

*Amina Chatwin*

There was a Humanist Memorial service at the Hatherley Manor Hotel, Near Gloucester, on January 31st to celebrate the life of David Bick, who died on February 19th.

There were groups of Walkers, groups of (had been) Racing Cyclists, groups of Vintage Car enthusiasts, Industrial Archaeologists, Mining Enthusiasts, and Engineers — there must have been almost two hundred and fifty people in the room, all brought together by their memories of someone that, on his own admission, and with the agreement of everyone present, had been the most awkward of men. I met friends from as far afield as South Wales and London, all gathered to remember an extraordinary man for whom they had a great respect and more than a little love. He was decisive, uncompromising, irascible, and taciturn, yet he also had a strong vein of humour and endeared himself to us in many ways.

David's wife Sheila told how she found a letter addressed "For my two sons, in the event of my decease". Thinking thankfully that this would be wishes for funeral arrangements, she found that, typically, it only contained exact instructions for starting up his several vintage motor vehicles.

David Bick was born in 1929. he went to Cheltenham Grammar School and spent four years at Leeds University, gaining a first class honours degree in mechanical Engineering.

He spent his working life at Downtys, where he was a brilliant stress engineer. He worked on hydraulic pit props in the Mining Division, and later on hydraulically operated undercarriages for aircraft. He designed booster retarder equipment for moving railway trucks in marshalling yards, followed by Oleo systems; both of which were used in the country and on the mainland of Europe. He was more recently working on flexible drill heads for drilling curved holes under the North Sea.

In later years he moved to Dowty's Technical Department at Brockhampton. At Dowty Nucleonics he worked on the raising and lowering of nuclear rods. He was awarded the Institute of Mechanical Engineer's Bramah Medal in 1980 for his outstanding contributions to the advancement of mechanical engineering, particularly in hydraulics.

From an early age he was interested in mining and founded the Welsh Mines Society in 1979. His son, Edward, said in his "appreciation" that until he went to school he thought everyone spent their holidays on old mining sites!

He produced a steady stream of publications, beginning with *The Gloucester and Cheltenham Railway* in 1968, the history of the early horse-drawn tramway, and *Old Leckhampton* in 1971 which followed the history of a branch line to the quarries on Leckhampton Hill. Between 1975 and 1978 came a series on mining: *Dylife* and then *The old Metal Mines of Mid-Wales* in five parts (these were later published in one hard-back edition). There was also *The Hereford and Gloucester Canal* 1979, *The Old Industries of Dean* 1980, *The Old Copper Mines of Snowdonia* 1982 and 1985, *Frongoch Lead and Zinc Mine* 1986, *Sygun Copper Mine* 1987 and the *Mines of Newent and Ross* 1987. There was an enlarged hard-back edition of *Old Leckhampton* in 1994. In the same year he wrote, in collaboration with Philip Wyn Davies, *Lewis Morris and the Cardiganshire Mines*, published by the National Library of Wales.

David's writing always grew out of his work in the field, and I remember many happy hours with him and friends on old mining sites.

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**David Bick: An appreciation from his colleagues in the Early Mines Research Group**

David Bick's wide ranging interests and questing mind led him to support many new lines of enquiry. His seminal works on the history of metal mining in Wales were about the only ones at the time to seriously discuss the possibility that some of the workings could be prehistoric. As such he became involved with the Early Mines Research Group in 1989 and was a very active supporter of our activities thereafter, visiting the Group's excavations at the Darren Hillfort last summer, although clearly very ill.

It is difficult to comprehend now with several monographs on the Bronze age mines of the British Isles published, that as recently as 1983 the *Proceedings of the Prehistoric Society* which purports to be the leading journal for prehistoric archaeology in Britain, could publish a major article claiming that the mines with stone mining hammers were in fact 19th-century workings. At this time most of the historians of the Post medieval mines of Britain seemed to concur, citing the absence of

documentary evidence for the early working, which was bad news for the Bronze Age!

In Wales a small number of individuals including David James at Great Orme and Simon Timberlake at Cwmystwyth carried out very limited excavations to obtain material for radiocarbon dating. In 1988 a small team of the recently formed Early Mines Research Group under Simon carried out further excavations at Parys Mountain, Nantyreira and Cwmystwyth. The dates from all three mines showed they were Bronze Age, and following this success, the more properly funded campaign of excavations began at Cwmystwyth, culminating in the BAR monograph published in 2003, always with David's active support.

This was very wide ranging, from the academic to the practical, often providing us with challenging comments to consider. The deep excavations through loose fill at Cwmystwyth needed careful shoring for which David as a qualified engineer was able to assist us in the design and also to carry out the necessary professional examination and approval. He also designed and built us a lightweight but robust hoist to raise the spoil out of the workings (christened the 'Bick winch'). On one of his many visits to the excavations he wandered off exploring only to return, and with his typical modest and understated manner to say, 'You archaeologist fellows know more about these things than me, but I think there is an early burial chamber over there, perhaps you'd like to have a look at it'. Sure enough there was an unrecorded stone cist surrounded by a ditch, almost certainly of Bronze age date, and at the time of considerable importance as the only contemporary monument in the vicinity of the mines.

David also published (with Philip Wyn Davies of the National library of Wales) *Lewis Morris and the Cardiganshire Mines* which contains early 18th-century descriptions and illustrations of the stone mining hammers and Morris's prescient remarks of their likely age. His continuing interest led him to publish some papers specifically on aspects on prehistoric mining. Most of the Welsh mines are polymetallic, mainly of lead/zinc mineralization but seemingly worked in the Bronze Age for their copper. David speculated on the likelihood that the lead was in fact already being worked in the Bronze Age ('Bronze Age copper mining in Wales — fact or fantasy?' *Historical Metallurgy* 33). This seemed a little unlikely to the rest of the EMRG, but then the discovery of an Early Bronze Age burial with lead beads in Scotland showed that the possibility of Bronze Age mining for lead could not be ignored in Wales.

Whilst he never shied away from challenging our ideas when he felt this was due, David was always generous in his support of archaeological work, providing the EMRG

with funding on numerous occasions. Only a month before he died we received a cheque for £500 in the post. Modest as always, he wished us well in his matter of fact sort of way, his parting comment being '...this is of rather more use to you than me now!'

David was always excellent company and meetings were always lively and exhilarating whether discussing metallurgy or bowling along the mountain roads of central Wales in his 1928 open top MG. He will be sadly missed at our future excavations, but his contribution will continue.

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Two other members who have passed away since the last issue of the newsletter are Friedrich Toussaint (Germany) and Andrew Lawrence.

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## Pay and Power Project

A West Midlands Access to Archives project called Pay and Power has been providing support for the cataloguing and publicising of collections for archive services across the region.

As part of the project, work is underway on the records of the firm of Noah Hingley & Sons. Hingley & Sons were a famous Black Country iron manufacturer and were recently discussed by Paul Belford (see *Historical Metallurgy* 38, 47–59). Hingley's are most famous for making the anchors for the Titanic. The biggest anchor, 15 tons in weight, was hauled from Netherton Ironworks to the nearest railway station by no less than 20 shire horses, although this was something of a publicity stunt as another photograph of the anchor being hauled to the testing house at Netherton clearly shows that eight horses were sufficient for the task.



Figure 1. One of the SS Titanic anchors



Further details can be found on the website  
<http://www.mlawestmidlands.org.uk/>

It is the intention that all catalogues will be incorporated into the Access to Archives database which can be searched online.

<http://www.a2a.org.uk/>

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## Dates for your Diary — HMS

The AGM will be held in London on Saturday 10 June. The AGM itself will be in the morning as usual. We will then have two lectures on bellfounding and gunfounding in London and after lunch there will be a visit to the Whitechapel Bell Foundry. We are restricted to just 40 for the Foundry visit (though of course there will be no limits on the numbers attending the AGM). Details will be sent with the official notification of the AGM

Conference this year will be the weekend of the 15–17 September and will be held in the Forest of Dean. A full day of visits is planned as per normal and there will be lectures on recent work in the area. Following the normal pattern members short talks will be most welcome. If you would like to offer something please contact Bob Smith

Email: [smithbrown@basiliscoe.fsnet.co.uk](mailto:smithbrown@basiliscoe.fsnet.co.uk)

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## Archaeological Sciences of the Americas Symposium 2006

September 13–16, 2006

The University of Arizona, Tuscon, Arizona USA

### CALL FOR SUBMISSIONS

The organizing committee of the Archaeological Sciences of the Americas Symposium is pleased to solicit contributions for 2006. The Biennial Symposium will focus on studies, techniques, and approaches that emphasize the analysis and interpretation of prehistoric and historic materials, human cultures and ecology. One of the sessions will be on Material Culture Studies. Further details on the website

<http://asas06.ltc.arizona.edu>

## The Sixth Conference on the Beginnings of the Use of Metals and Alloys (BUMA VI)

15th–20th September 2006, Beijing and Anyang, P. R. CHINA

The general theme of BUMA VI is Metallurgy and Civilisation. A number of topics have already been suggested,

- Early Metallurgy in the Eurasian Steppe,
- Lost Wax Casting Technology: origins and diffusion,
- The Origins of Piece-mould Casting Technology, and
- Copper and Lead smelting in Continental China.

They will not be sending further mailings so please refer to the web site. [www.nri.org.uk/BUMA.htm](http://www.nri.org.uk/BUMA.htm)

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## IAMS Summer School 2006 Ancient Mining and Metallurgy

Held at the Institute of Archaeology UCL  
31–34 Gordon Square, London, UK

10 to 14 July: Ancient Mining Technology

Main Speaker: Professor Tim Shaw

17 to 21 July: Smelting and Metallurgy

Main Speaker: Professor HG Bachmann

£100 per week, 150 for both weeks

(Fee Bursaries available)

Contact [c.cohen@ucl.ac.uk](mailto:c.cohen@ucl.ac.uk) for details and bookings

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While submissions to the Newsletter are welcome at any time, if you want to have something in a specific issue of the newsletter then it needs to be with me by the following deadlines.

**1st March,**

**1st July**

**1st November**

Contributions can be sent in any format (hand-written, typed, email, floppy disk, CD-ROM, etc).

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