

BEFORE THE COPPER KING

Mining history in Britain appears to be undergoing a powerful process of revision, perhaps even an 'industrial revolution'. While the origins of sophisticated deep coal extraction have been significantly redated and re-evaluated in Leicestershire (*Bulletin* 18.4), other recent discoveries have been at least as important for copper mining history.

The story of copper extraction in North Wales has hitherto focussed on its flowering in the late eighteenth century, and especially on the career of Thomas Williams, the 'Copper King'. The period's physical evidence is particularly apparent in the technicolour splendour of Parys Mountain, the port of Amlwch, and the manufacturing base of Greenfield Valley. Now, at Llandudno's Great Orme, a copper mine has been discovered which pre-dates William's enterprise by at least 3600 years. Of unprecedented size for its period, it has opened a radically new regional and international perspective on copper mining history. World-wide media attention marked the mine's first public opening last year; archaeological excavation and commercial enterprise have been successfully combined, and as the site's second tourist season draws to a close, continuing investigation has confirmed its international significance.

The Great Orme, a 200m high outcrop of Carboniferous limestone, dominates the coast above Llandudno. Its nineteenth-century copper mines are well documented. Output was small compared with Parys Mountain, but peaked several decades later, around 1830-50. Bronze, stone and staghorn items found in earlier workings were, at that time, attributed to the Romans. More recently, historians such as Chris Williams, David Bick and G D Jones began to consider that Bronze Age origins were more likely. In 1979, archaeologist Duncan James discovered bone tools subsequently carbon 14 dated to 900BC, in underground workings hitherto associated with the nineteenth century.

Nine years later, mining engineer Tony Hammond and geologist Andrew Lewis discovered the presently exposed Bronze Age workings during a land reclamation survey. The local authority's prospective car park scheme was abandoned, and a 40 year lease granted to the newly-formed Great Orme Mines Ltd. Archaeology and tourism were to meet in a commercial attraction, summertime public

access supporting a rolling programme of winter excavation.

The site presented many archaeological challenges, not least the initial wholesale machine excavation necessary to gain access to the historic mine entrances. 100,000 tonnes of mining spoil were removed, followed later by the top of the overlooking hill. Four roughly parallel main copper ore lodes were exposed near the surface, running north-south across the site, mainly in vertical fissures. From here has come the earliest evidence of mining so far—charcoal which has been carbon 14 dated to 1800BC. The early surface workings are disturbed by later industrial structures, presently undergoing excavation. Below them, a limestone cliff face has been exposed, pock-marked by Bronze Age and later tunnel entrances.

Over 3,600m of underground workings have been surveyed so far. Excavation is led by Resident Archaeologist Frank Jowett, assisted by Gwynedd Archaeological Trust and a small team. Most work is carried out during the winter season, with the mine closed to the public. Lighting and ventilation problems offset the inherent advantage of under-cover excavation, with all work also subject to the restrictions of the Mines and Quarries Acts. Compass, clinometer and tape produce the tradi-

tional record, combined with photography and infra-red survey techniques. Electronic data is downloaded to computer, eventually to produce a three dimensional image of the mine.

To date, exploration has shown the mine to extend 240m into the hill, and in the later industrial workings to a depth of 70m. The Bronze Age passages are significantly smaller than those of the nineteenth century, typically no larger than the size of the ore vein being followed. At the lower Bronze Age levels, around 25m below surface, they are only 0.2m wide and 0.3m high. It is surmised that young children were used as miners here. The nineteenth-century passages are by contrast more spacious and regular, distinctly horse-shoe or 'coffin' shaped, some following the near vertical veins upwards. The scale of Bronze Age working is epitomised by a chamber dated by carbon 14 to 1400BC and measuring 10m by 15m and 12m high. Half filled with mining spoil, it is very largely mined out, and appears to have been subject to only slight nineteenth-century reworking. It represents a major mining achievement given the acknowledged Bronze Age mining methods of stone maul, bone chisel and fire.

Trenching out and opencast working of the exposed blue-green veins exploited the near-surface carbonates-oxidised ores suitable for



The Crusher house at Frongoch lead mine, in 1984; see *Welsh Mills Group*, page 6

immediate smelting. The frequent discovery of early charcoal suggests that fire-setting was also employed as a mining technique in the Bronze Age—in harder areas of rock, the face would be cracked by heating, and shattered when quenched with water. Stone maul and bone chisel combined to work copper ore from the softer dolomitised limestone. Some 800 granite beach stones, weighing up to 29kg, have been recovered from the mine. Many show evidence of hammering at one end, although the larger stones would seem too heavy for normal use. About 8,000 animal bone chisels have been retrieved.

Such artefacts were believed before the current excavation to represent the extent of Bronze Age mining tools. However, small bronze fragments found in workings dated to 1400BC are now thought to be parts of Bronze Age miners' tools unique in Western Europe. It is finds such as this which have placed the Great Orme at the forefront of international mining history. Carbon 14 dates from charcoal of 600BC–1800BC have been obtained so far, suggesting a working span of 1200 years for the mine. It is thought that exploration of the earliest workings may push this sequence back by a further 200 to 500 years.

Unfortunately, no evidence of Bronze Age ore smelting has been found, with the area greatly disturbed by later industry. Nor is there local evidence for tin mining—the other necessary ingredient for bronze production. The uses of the extracted copper ore therefore remain, for the moment, a matter for speculation.

As would be expected, there is much evidence of later industrial age mining. Shot firing holes and iron pick marks show that more sophisticated techniques allowed ore extraction from harder rock than was permitted with stone mauls and bone picks. Drainage adits and tramming levels allowed the later workings to extend deeper and further, to reach the copper sulphides at 90–120m depth. These more chemically complex ores required pre-roasting before smelting, and were not used in the Bronze Age.

Down through one vein runs Vivian's Shaft, dropping to its 1830's depth of 140m. Into it ran pumping rods, activated by a water powered 'flop-jack engine'—nick-named Tom and Gerry, after two Regency bucks—1200m distant. Stone-lined pits for the rod supports still mark the route to the precipitous west face of the Orme. The 1835 base of the later steam pumping engine has recently been found. No

evidence of lifts or cages has been discovered, indicating the prolonged use of wooden and later chain ladders for mine entry.

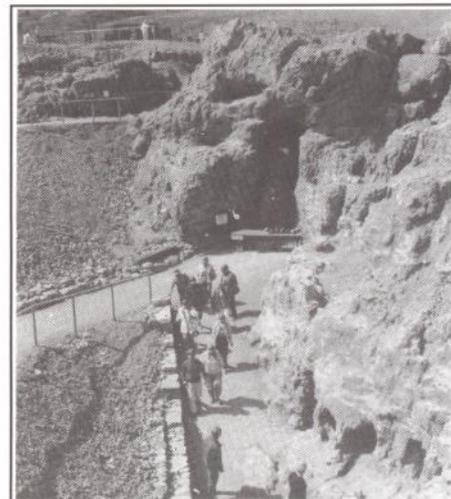
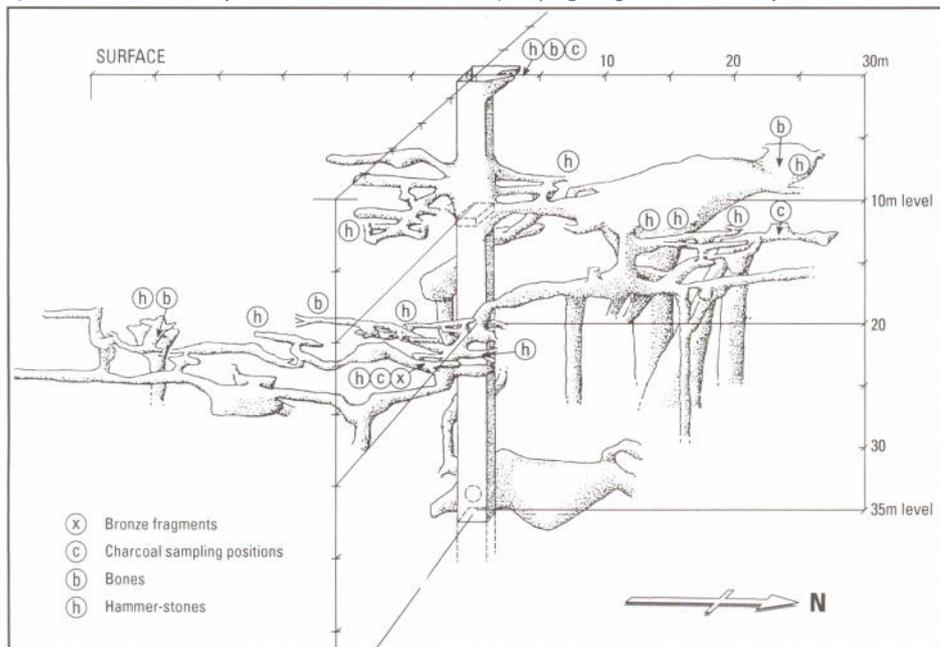
It is intended that as new mine areas are opened up, visitor access will be enhanced. Each season's discoveries will be exhibited, interpreted and published—providing a continually updated attraction for the visitor. At the moment, an audio-visual presentation sets the scene for a thirty minute underground guided tour to 18m depth. While many of the 42,000 first season visitors constituted 'passing trade', an international flow of mining enthusiasts and experts paid testimony to the site's global interest.

The mine's singular significance is its size for the period—the largest Bronze Age mine yet discovered anywhere. Its importance for archaeology is almost impossible to overstate, and its evidence will radically alter Bronze Age industrial and commercial history.

The Great Orme Mines are open from April to October. Details are available from Great Orme Mines Ltd ☎ 0492 870447.

Paul Sillitoe

The assistance in preparing this article, of Tony Hammond, Andrew Lewis and Frank Jowett of Great Orme Mines Ltd is greatly appreciated.



above: Visitors about to enter the Bronze Age workings; the dark holes (bottom right) are some of the Bronze Age entrances. Photo: Great Orme Mines Ltd
left: Three-dimensional (oblique) view of Bronze Age workings with sites of finds. The vertical shaft at the centre is Vivian's Shaft of the 19th century.

Andrew Lewis & Great Orme Mines Ltd

EXPERIENCE THE MAKING OF BRITAIN

In 1993 the English Tourist Board will be launching a major campaign in which industrial archaeology societies and attractions affiliated to the AIA may wish to participate. The campaign will celebrate the growth of Britain as an industrial nation—from the early days of the Industrial Revolution up to the present time. Through a programme of leaflets, posters, competitions, package holidays, events, and other special promotions the campaign will encourage more visitors to those areas and attractions throughout the country which have strong connections with our industrial heritage.

The emphasis of the campaign will be put on convincing the public that 'industrial' does not have to mean dull, dirty or boring but that our industrial history can be fascinating and fun, and is often set amongst stunning scenery, both rural and urban.

The campaign will include power sources, extraction industries, manufacturing, public utili-

ties, commercial and domestic buildings and associated development. Canals, railways, docks and other transport; model towns and the communications industry will also be



encompassed. Visitors to participating attractions will be able to see how iron and steel, textiles, glass, china and pottery were manufactured, in many cases having the opportunity to watch the actual process or even sample the product (chocolate or cider, for example).

All participating attractions must be open to the public on a regular basis, be actively managed and wishing to promote themselves. They should all have signed the National Code of Conduct for Tourist Attractions.

The English Tourist Board wants to bring the campaign down to a very local level, encouraging people to notice buildings and objects with industrial associations that they have walked past many times without considering what they were—or still are—used for. It hopes that local groups of historians and industrial archaeologists will organise walks, talks and lectures about their areas; that local authorities will embrace the campaign's theme in annual festivals and council run museum exhibitions,

TICCIH IN SPAIN

After Belgium and before Canada, the biennial International Congress for the Conservation of the Industrial Heritage (TICCIH) was held this year in Spain, with a visit to Barcelona and a conference in Madrid.

The pre-conference, superbly organised by the Catalan museum service, revealed many things of great interest: about Catalonia, the true potential for adaptive re-use of industrial buildings, and the effects of climate on industrial architecture.

Catalonia is the industrial powerhouse of Spain, its industrialisation making it the first such developed area on the Mediterranean by the mid-nineteenth century. By the 1970s it still accounted for 75% of Spain's textile capacity and 60% of its metallurgy. Yet the early Catalan textile revolution was fuelled by Welsh coal and equipped by Yorkshire entrepreneurs, and its remains provide striking lessons for industrial archaeologists from Britain.

The construction of vast industrial spaces in Barcelona had a very early origin. The Drassanes at the harbour end of the Ramblas are the world's greatest extant Medieval shipyard. Eight of the cathedral-like sheds were begun in 1378, but the last three were not completed until the seventeenth and eighteenth centuries. The vast area inside enabled simultaneous construction of thirty galleys. This maritime heyday of the Aragon-Catalan Kingdom was vital to all our histories in that it finally allowed the wresting of the Mediterranean from the Turkish fleets. Standing near the Maritime Museum enclosed in these huge halls one is bewildered by one's lack of knowledge of spectacular industrial remains abroad. Facing one is the huge eighteenth-century cannon-foundry of the Spanish Fleet, and towering above are cousins of the Eiffel and Blackpool towers, with a spectacular cable-car system strung between. This Aeri del Port of 1926-30 has a 3,876 feet long ride supported by 257 and 390 feet high rusting steel-lattice towers.

For the Catalanian minority culture it seems to be a matter of honour that its heritage should be cherished, and often adaptively re-used. This ethos even extends to factory chimneys. The three chimneys of Barcelona's original power station have been retained. So has a concrete stack in Barcelona's third-

worldish outskirts where delegates arrived in time to see an aluminium saucer being raised to crown it and contain a surreal nightclub. The very symbol of the town of Terrassa (20 km north of Barcelona) is the redundant chimney of a brickworks.

A realisation grows that Catalans have a long tradition of cherishing and re-using their surroundings. The most spectacular example of Art Nouveau in Terrassa, La Masia Freixa, with its parabolic roof and sweeping columns, started as a spinning mill. In 1907 it was converted into an entrepreneur's residence. From 1936 to 1939 it was The People's Library, and now it is the Municipal Conservatoire of Music. In Barcelona itself the initial welcome for delegates took place in the University School of Industry, formerly a textile factory operated from 1867 to 1895. In 1908 the buildings were taken over by the university. The tall factory chimney has, of course, been kept.

Re-use can extend to great lengths to achieve original effects. Four groups of concrete silos for a cement works outside Barcelona are gradually being converted to offices by Ricardo Bofill's internationally known architectural practice, itself based in one of the silo groups. Windows have been punched in the walls and a staircase spiralling inside one silo gives access to those adjoining. A roof garden has shrubs trailing over walls scarred by the former processes with no attempt made to produce a gentrified exterior. A second converted silo is Bofill's house above and an architectural model store below, with cement chutes adorning the ceiling.

The former power station, the Central Catalana d'Electricitat, is also now offices. This has a striking construction of buttresses of brick and tile-work clasped between green-painted lattice girders. This frame resisted the vibration of the steam engines and supported the overhead crane which still soars gloriously over the secretaries and computer operators inside. Elegant stairs lead onto a gallery with the original control panels. This coal-fired power station, built in 1897, was converted into the Catalan Hydro-electric Company's offices in 1980. It is much smaller than Battersea, but the story of re-use is infinitely more successful.

However, it may be that re-use has overreached itself. After the Born Market, built in 1873-6 and Catalonia's finest example of iron

and glass construction, became disused in 1977, there was a fierce campaign of public protest to ensure its survival. But infrastructure improvements to accompany the Olympic games found only short-term roles for this and the Northern Railway Station (closed in 1972 and seen on television hosting Olympic table tennis). The French Railway Station (Estacio de Franca) built for the World Exhibition of 1929 and reputedly the largest in Europe when completed, was refurbished for the Olympics but its vast curved train-sheds are now mostly quiet. Another prodigy of the 1929 Exhibition was the harbour cable-way, but its groaning machinery and rusting towers escaped Olympic refurbishment and one wonders how long this unsung wonder of southern Europe can be maintained. The region is full of competing problems of under-investment. Nevertheless, the Catalan people and their government see their industrial heritage as an integral contributor, through re-use, to their campaign to enhance their surroundings.

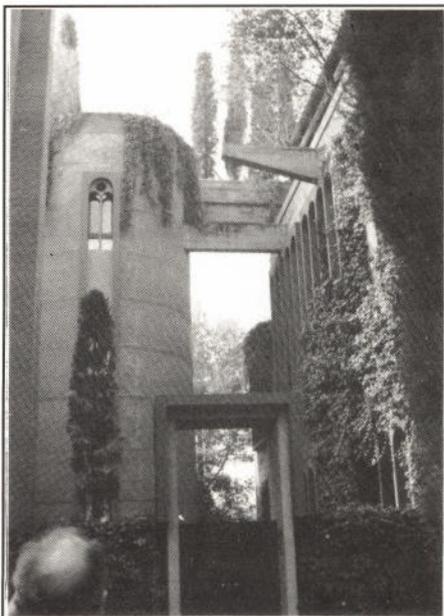
A more sinister conversion, that of the Casaramona Spinning Mill in central Barcelona to a barracks for Franco's police in 1939, illustrates lessons of interest concerning the adaptations of British industrial structures to a different climate. To British eyes the idea that these blocks with no lighting in the barrel-vaulted roofs could have been spinning-sheds seems bizarre; but then one remembers the intense heat and light which have to be ameliorated. Such roofs would not survive a severe frost. Some of the tall blocks of textile mills that survive, as in the rural model settlements or 'Colonia' at Colonia Guell or Colonia Sedo, have no windows but brick-built louvres to let in any breeze and exclude sun.

The 60 industrial Colonia in Catalonia were built following English models, in remote locations with water-power potential. However, such has been the decline in the textile trade that all the factories have closed and the Colonia are threatened. Those at Sedo and Guell have conservation schemes and the buildings are full of small workshop and factory units. The workers' tenements at Sedo mar-

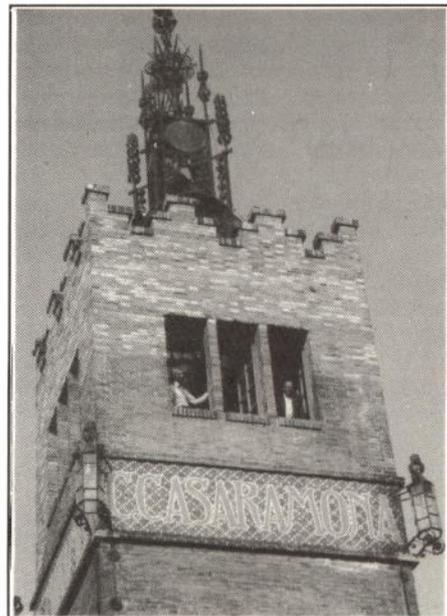
and that the attractions themselves will take up an entry in the campaign's main promotional print. Grants are available to help attractions undertake new promotional initiatives, paid on a sliding scale based on their visitor numbers.

The campaign will provide an overall promotional umbrella to help publicise these activities, principally through its print and public relations programme. In addition, some of England's regional tourist boards and local authorities will be producing literature for the campaign.

The English Tourist Board is keen to learn of any local events and activities in 1993 which can be incorporated into the 'Experience the Making of Britain' campaign. If you, or your society, are organising something please notify your regional tourist board or the campaign office direct by contacting Helen Beioley, Project Manager, Industrial Heritage '93, English Tourist Board, Thames Tower, Black's Road, London W6 9EL. *Helen Beioley*



below left: A study in creative re-use of difficult structures: Ricardo Bofill's offices constructed in a disused concrete works silo *Photo: Peter Wakelin*
below right: Tower at the Casaramona spinning mill, Barcelona *Photo: Peter Wakelin*



edly resemble those lost from early settlements in Britain; but the extravagant architecture of Colonia Guell is a pleasure to behold, its pinnacle being the adventurous inclined struts and sweeping vaults of Gaudi's Crypt-Chapel. In all of this Catalan industry there is continual reference to Britain. The textile mill at Colonia Guell was said to be built on 'The English Model' of 'Manchesteria' with a multi-storey mill fulfilling a number of different functions. The Guell mill was steam-driven and powered, like all the Catalan mills, with Welsh coal. Yorkshire textile-mill engines and Lincolnshire road-rollers are preserved in the most surprising places.

Following the visit to Barcelona, the main conference in Madrid was designed to address outstanding issues in industrial archaeology. The main theme was twentieth-century industrial heritage, which included, amongst other topics, lectures on British, Italian and German car-factories. Some interesting themes emerged from this contrast of material—which is what international conferences are all about. The British factories were either organic growths with a multiplication of single-storey workshops or new large-scale schemes. Specialist German factories often depended on multi-storey engineering workshops, whilst Fiat, like the American manufacturers, had a purpose-built multi-storey production-line spiralling down from a roof around which was laid out a test-track. From these papers and others on twentieth-century industry, it was apparent that significant industrial developments and variations are witnessed by twentieth-century sites and buildings, but that throughout the world—from power stations in Israel to steel works in Poland—their recording and conservation is lagging seriously behind their destruction. Rapid assessments of twentieth-century remains are needed urgently.

TICCIH had also designed a number of seminars to stimulate round-table debate. I was asked to chair the group on fieldwork. Again there was the international contrast: the British using government archaeologists to survey sites, the Germans having free-lance specialists tendering for the work, and the Americans using student summer schools totally sponsored by local groups and authorities coordinated from the centre. The most active participants resolved to attempt to write a series of short fieldwork manuals, with Eric DeLony of the Historic American Engineering Record and myself acting as co-ordinators. It was resolved to hold sessions at future conferences on specific aspects of fieldwork.

The next TICCIH conference, for the first time in many years, does not clash with the AIA conference. It will be held in June 1994 in Montreal and Toronto, Canada. Intermediate conferences supported by TICCIH include those exploring former communist states—at Gdansk in 1993 and in the Urals in 1994. In Spring 1995 the Netherlands and the German Ruhr combine to show something of their industrial heritage and in 1996 Italy will host a conference dedicated to the detailed considerations governing the re-use of industrial buildings. Then in September 1997 Greece will host a full TICCIH conference at Thessalonika. Try to join one of these conferences. They are invaluable for those working in, or taking an active interest in, the world of industrial archaeology.

Stephen Hughes

AIA NEWS

HERITAGE MANAGEMENT DAY

A seminar was held on Friday 11 September at Cirencester prior to the 1992 AIA Conference. This was convened by the Research and Publications Committee of the AIA following suggestions made at the Members' Forum at the 1991 conference. Forty four delegates attended including eleven contributors of short papers. The sessions were chaired by Marilyn Palmer.

The papers were divided into themes: landscapes, monuments protection, and adaptive re-use, and open discussions followed them. On landscapes, Gary Marshall of the National Trust described the Trust's role with industrial sites, particularly those acquired through Enterprise Neptune and with special reference to the Ravenscar Alum Works on the North Yorkshire coast. Graham Lee of North York Moors National Park gave an outline of the Rosedale project, where parts of the extensive remains of ironstone extraction with its associated railway system are to be conserved. Vervan Heal of Exmoor National Park described the recent attempts at assessment of the resource of industrial archaeology within the Park and the constraints of land ownership on potential exploitation for tourism.

David Stocker of English Heritage opened the second session and outlined the Monuments Protection Plan (MPP) and the forthcoming consultation procedure for assessment of industrial remains. Local society and individual involvement in the selection process will be invited and recommendations considered for amendments or additions to existing Scheduled and Listed sites. By this means a representative selection of the most important monuments in England will be established. In addition the local Sites and Monuments Records (SMRs) and the National Archaeological Record will be enhanced and able to be utilised as better tools in future planning and other proposals. David Cranstone of the Cranstone Consultancy is actively involved in the above assessments and described his work in respect of the lead mining industry. He and David Crossley are working on industries such as lead, copper, tin, brass, iron and steel, coal and glass making. Michael Trueman and James Quartermain of Lancaster University Archaeological Unit described the role of planning in the presentation of industrial archaeology. Within Lancashire, the Unit has assisted in creating procedures for the management of the archaeological resource through the county SMRs. The Unit has been involved in developer consultation prior to plan submission, then made preliminary assessments so that plans submitted include an archaeological report with firm proposals which may include preservation or recording.

The final session concerned buildings and their adaptive re-use, and four contrasting papers were presented. Cameron Hawke-Smith of Gladstone Pottery Museum discussed the problems at the Museum from its initial opening days in the early 1970s, followed by a decline in visitor numbers, increasing building repair costs, and under-funding. He outlined the proposals implemented to re-establish the visitor attraction at this unique site. Andrew Fielding of Vale Royal District Council described the Lion Salt Works Museum at Marston, the last works to use the open pan brine evaporation system. There are problems of

subsidence, ephemeral structures and a lack of concerted political will to set the Museum on a proper footing. The initial success of the Ruddington Framework Knitters' Museum in Nottinghamshire was described by its Curator, Jason Doherty. The confined site has meant a ceiling on visitor numbers and he examined future strategies for the Museum, staffing levels, external financing and increasing display space. Tony Conder, Director of the National Waterways Museum, outlined the rehabilitation of the 22 acre site at Gloucester Docks with its 19 listed buildings, subject to a total demolition proposal in the 1980s. An enlightened City Council led the way with the conversion of the North Warehouse to city offices and a private developer has been involved with the remainder. Existing warehouses and mills have been re-used, along with limited new building, to provide office accommodation and retail premises forming a two and a half miles linear visitor attraction which includes the Llanthony Warehouse, now used for British Waterways offices and the National Waterways Museum.

The consensus of the delegates was that the seminar had been successful and that others should be arranged as part of the run-up to future AIA annual conferences.

Peter Neaverson

A full report of the 1992 AIA Conference will appear in the next *Bulletin*.

NEW MEMBERS

The Association welcomes the following new members, who have joined in the past year:

B A Attridge, Middlessex
D W Briggs, Matlock
L Colsell, Stowmarket
William Duck, Sussex
Lee Gillibrand, London
Shane Gould, Bath
H L Harries, Dyfed
Martin A Hobson, Kidderminster
Joan Kent, London
M M Lyon, Telford
M S McKay, Dundee
Jonathan Minns, Hove
David Palmer, Measham
Janet Peatman, Sheffield
Ken Peden, Liverpool
Christopher John Pluck, Hampshire
J A Rother, Exeter
S M C Scott, West Midlands
C R Shephard, Surrey
P H J Smith, Buckinghamshire
Laura Sturrock, Southampton
Andrea M Taziker, Manchester
Anne Wiggans, Lancashire
Mr and Mrs M Wilkinson, Staffordshire

In addition, the following organisations have affiliated to the Association or become institutional subscribers:

CNRS URA, Rennes, France
Parks Environment Library,
Hobart, Tasmania
Somerset Museums Service
Combe Mill Society, Oxfordshire
Mineral Tramways Project, Cornwall

SMALLSMITH'S DIARY

16 September

This weekend was our region's annual IA conference (known as EARIACHE for short), where experts from all around come to expound on subjects industrial archaeological. Many fascinating contributions were given, from an account by Pipeclay Mills Group of three local pitchback wallowers, to a study of the Oxford Canal. I thought the latter presentation, based on a recent boat trip, was very well organised, as all 187 slides were shown in strict order starting at the north end of the canal and proceeding picture by picture to the south. The insightful commentary touched on matters such as speeding 'noddy boats' and how each bridge parapet differed from the last. My wife, inexplicably, called it 'pointless and time-wasting'. I'm not sure that she yet has a grasp of true IA methodology.

Mrs Dobbin was there to recount her work recording a dockside steam flour mill single-handedly (apart from a troop of boy scouts who held the ends of tapes and were sent to the dirtier, more inaccessible places to measure up). Her slides were generally disappointing. However, the few she had entrusted to the scouts to take, with her as the scale, ('a very large scale' as Neill rudely whispered, saying that everything else looked small by comparison) were both in focus and correctly exposed. All this was a remarkable piece of work and an example to us all; although I feel Mrs D went on too much about how it was an example to us all, and 'particularly to Mr Smallsmith'. For once, however, I was not stung by her criticism, for true to my new year resolution to do more field research, I spent several weekends this summer on a neglected but important project to photograph Victorian school buildings in the region. I said as much in the discussion session, only for Mrs Dobbin to say 'harrumph' loudly. Even if Victorian schools are not as strictly IA as Mrs D would like, my photographs will be a lot more useful to future generations than hers.

6 October

Neill came round this evening in a state of excitement. We all know he is a positive dynamo when it comes to building links with Business, but he had excelled himself, having just negotiated a 'preferential' deal to install a computer system at the museum where he is Curator (or Director/Manager as he prefers to be titled). He has pledged our IA society access to set up a fully cross-referenced database of all IA sites locally. At the moment this information is held on a card system, which was badly affected when Bolt spilt a pint of beer over it at The Jolly Pigbed. Why he had the card index there is still a mystery, although he has admitted he was performing a traditional Black Country bargemens' jig for some tourists at the time of the accident. As a result, the index has a very beery aroma, many cards are a mass of pulp, and we are still trying to weed out the beer mats which Bolt cheerfully put in 'to give a bit more substance'. A computer will be a great advance.

15 November

Last night was our first trying out our database, and several members turned up in an air of great excitement. It was a cold night with persistent drizzle, and as time passed and no sensible information had

yet appeared on the screen, the level of excitement dropped considerably. The information about every site had been broken down into 97 different boxes (called 'paddocks', I think), and at first no-one seemed to know quite which box each piece of information had been left in. In fact, most boxes were empty, as 32 of them had been prepared by Bolt exclusively to record rare kinds of valve gear on high pressure steam engines. There was also some difficulty in finding particular kinds of sites. We tried repeatedly to count the number of breweries in the region, and time and again received the answer '0', even though there were several in our old index. This may have been due to someone thinking sites should always be classified under 'fuels' if they used coal, resulting in textile factories, brickworks, limekilns, gasworks etc being somehow mislaid in the machine in a manner I found very difficult to grasp. Searching for coal mines, however, produced a most satisfactory count of 270 in the Buttockbarn district alone, even though I must say I had previously thought this was off the coalfield. Computers truly do open avenues of new research!

My wife suggested that we approach national organisations to see if there is some better kind of standard system already in use. Most members present felt this would not suit our unique local sites, but my wife does turn out to be right surprisingly often for someone with so little background in IA.



COUNCIL CHANGES AT THE AGM

The AGM of the Association for Industrial Archaeology was held on Sunday 13 September at the Royal Agricultural College, Cirencester. About one hundred members attended. Janet Graham retired as Conference Secretary, Carol Whittaker retired as Publicity Officer, and Stuart Smith retired as Membership Secretary. All were thanked for the excellent work they had contributed to the Association, especially Stuart Smith who had continued in the post for

many years and had been one of the original members of Council when the Association was founded. David Perrett took over as Membership Secretary, Roger Ford was co-opted as Publicity Officer, and David Alderton returned to his former job of Conference Secretary. With the exception of the President and Vice-President, the other officers and members of Council were re-elected en bloc.

As his three-year term had come to an end, David Alderton retired as President.

John Crompton was elected as the new President, and David Alderton as Vice-President. John thanked David for his role in the great achievements of the Association in the past three years: streamlining its management, gaining greater national recognition, launching its policy document, and obtaining a grant from the Department of National Heritage. These achievements create a solid foundation upon which the Association can develop in the coming years.

AFFILIATED SOCIETIES

Plans are now well in hand for the 1993 Affiliated Societies Weekend, to be held at Coalbrookdale from 23 to 25 April. As well as providing the opportunity for participants to raise questions of concern to their societies, it is planned to allocate more time for discussion than in the past. The programme will include contributions from the AIA's Site and Monuments Officer, Michael Trueman, and from Julie Williams, who is currently developing a thesaurus of terms relating to industrial period sites and structures. We shall also have lectures on 'getting your research into print' (with advice for societies on how to take advantage of the latest technology to produce

competitively priced publications), on 'health and safety in fieldwork', and on 'being a museum volunteer'. On the Saturday afternoon, John Powell has agreed to lead a walk on 'the other side of the river', which will give delegates the chance to discover one of the less well known areas of the Ironbridge Gorge.

At the Cirencester Conference, the Affiliated Societies Meeting was attended by representatives of eleven groups, and was addressed by Michael Trueman and Julie Williams, who gave us a brief insight into what the work they are doing will mean for local societies. The next mailing to Affiliated Societies, which will be sent out before the end of the year, will include a report on this meeting, as well as details of the

forthcoming Weekend.

There are still many groups who have not been profiled in the *Bulletin* in the 'Affiliated Societies Spot'. If you would like this free publicity, please send me the details of your society—a brief history, plus information about activities such as meetings, practical work, visits etc.

I would also welcome comments about, or suggestions for, Affiliated Societies Weekends. It is helpful to know of any speakers or topics you would like us to include. My address is 20, Stourvale Gardens, Chandlers Ford, Hampshire SO5 3NE.

Pam Moore

REGIONAL NEWS

GREATER LONDON

The **Royal Arsenal, Woolwich**, ceased much of its activity in 1967 and is now mostly confined to a small fragment at the extreme west end of this extensive old site. The area has been reduced from about 1200 to 76 acres. Ministry of Defence use may finish altogether by 1995/6. Manufacturing at the Arsenal was at a peak during World War I when many women were employed.

In 1812-16 a canal to the designs of Lieutenant Colonel Pilkington was built to carry materials in the Arsenal, the southern end being filled before World War II. This canal is now part of Thamesmead West and what remains is known as Broadwater. The entrance lock survives in fairly good order and the swing bridge which carried a line of the Arsenal light railway across the entrance is also extant. Thamesmead extends eastwards to Thames Water's Crossness site but not all this large area is yet redeveloped for housing. Much land is still fenced off with the public excluded and patrols by guards with dogs. It is intended to open a public walk along the whole river bank.

Woolwich Arsenal railway station building of 1905 has been demolished and judging from the Royal Academy Summer Exhibition its replacement is likely to be a high-tech affair. In architecture it seems high-tech rules OK at present and much by the Richard Rogers Partnership is to the fore. Just to the north west of **Marylebone** railway station a large new development called Marylebone Gate, between the railway tracks and Harewood Avenue, is likely to alter drastically the view northwards from the west end of the station concourse.

On the delta of the River Lea noxious industry has long been a tradition. Sulphuric acid was manufactured by **Berk Spencer Acids**, Crows Road E15. The site is now almost cleared.

The northbound bore of the **Blackwall Tunnel**, opened in 1897, was lined with glazed tiles giving a splendid period atmosphere in recent years. Following refurbishment work the tunnel is now reminiscent of nursery interiors. Tiling may still be seen in the Rotherhithe Tunnel.

London's electric power stations have been under threat for quite a while and at many sites not much is now left. The chimney of the 1950s **Deptford East generating station** was demolished on the morning of 11 April. There was a small crowd of spectators. Little now remains on the Deptford site. Granophast Wharf, Deptford, is now being demolished.

In Croydon the large red brick Victorian town hall in Katharine Street, built 1892-6, replaced the **Croydon Central railway station**, the railway approach to which can still be made out in the gardens to the east. Opened in January 1869 the Central Croydon railway branch never seemed exactly worthwhile. It was closed in December 1871, reopened in June 1886 and finally closed in September 1890. Rebuilding on the site still continues—a new library complex is being built at the south, and on top of the town hall, the new extension being designed by the Tibbalds/Colbourne partnership.

The **West London Railway** from Clapham Junction to Wormwood Scrubs is being refurbished and electrified for use by Channel Tunnel

trains with a new depot at North Pole junction near Old Oak Common. The **Battersea Railway Bridge** of 1861, five wrought iron arches by William Baker (LNWR) and T H Bertram (GWR), is something of a historic structure and its recent poor condition is being remedied for the extra traffic.

At the **Musical Museum**, Brentford, a major reorganisation of the paper music roll collection is nearing completion. Poor storage conditions had been causing considerable concern and a suitable part of the museum has been walled off and converted into a storage room with controlled humidity. Cleaning, cataloguing and inventory work continue. The proposed move to purpose-built premises is in abeyance owing to the state of the property market.

Nearby at the **Kew Bridge Steam Museum** the steam hall (formerly the first boiler house), dating from 1838, is having its grade II listed roof rebuilt. Restoration is funded jointly by English Heritage and the National Heritage Memorial Fund. The interesting and unusual trussed rafter roof construction consists largely of wrought iron flats with support by cast iron pillars and beams. For further information telephone 081 568 4757. At **Dock Road, Brentford**, the barge repair works of E C Jones and Son is reported to be in receivership and work there has ceased. This was one of the very last examples of a working yard up river.

Robert Carr

YORKSHIRE AND HUMBERSIDE

The first phase of the £6m scheme to put **Elsecar Workshops**, between Sheffield and Barnsley, to new uses, opened in April. The workshops were built in the mid-nineteenth century to provide engineering services to the collieries and industrial activities of the Earls Fitzwilliam, and include parts of the earlier Elsecar Ironworks. Tenants now include craft workshops, the National Bottle Museum, and a working museum of printing, the Hot Metal Press. Future plans include 'The Powerhouse', a hands-on exhibition about energy and power, and a two-mile railway. The Workshops are open from 11am to 5pm on Saturdays and Sundays in the spring and summer. The unique Newcomen pumping engine of 1795, in its original engine house, is open on summer Sundays between 3pm and 5pm.

The Yorkshire Mining Museum at **Caphouse Colliery** has restored the boiler house which supplied steam for the 1876 winder, and installed a new coal-fired boiler.

Wolf Safety Lamps of Heeley, Sheffield, have stopped production of miners' safety lamps after 110 years. In the 1880s Karl Wolf invented a lamp with a glass shield as well as a metal gauze, and fuelled by spirit rather than oil, so that it could be relit if it blew out underground. The firm was bought by mining engineer William Maurice around 1914 and brought to Sheffield, where it continues to make other forms of emergency lighting.

Four tons of wrought iron armour plate from HMS **Warrior** has gone on display at **Sheffield Industrial Museum**, Kelham Island. It is thought to have been rolled at John Brown's **Atlas Works** in 1860, and commemorates Sheffield's part in the heavy armaments industry. John Brown built up his firm by making railway springs, including the conical steel spring buffer that he invented. He moved to the rail-connected Atlas Works in 1856, and rapidly expanded his business by rolling armour plate

and railway rails and adopting Bessemer's converter to make cheap bulk steel. The works had been begun in 1853 by Armitage, Frankish and Barker, who went bankrupt. All that remains of the 1853 buildings is part of the office block (unlisted). The main entrance and tower were damaged during the demolition of later buildings this summer and had to be taken down. The early twentieth-century office block of another large steel firm, Jessops' **Brightside Works**, was demolished as unsafe about the same time after standing empty for many years.

Pontefract Museum is developing an exhibition about the local liquorice industry (commemorated in verse by Sir John Betjeman), and Yorkshire Arts have published an oral history book about it, called 'Talking Spanish' after the product's nickname.

About 300 metres of the **Leeds and Liverpool Canal** below the Bingley Five Rise Locks, opened in 1774, has been realigned during the building of the Aire Valley Trunk Road.

Danby watermill in the Esk Valley, North Yorkshire, has been restored to working order and is open from Easter to November.

Derek Bayliss and David Cant

NEWS

THE WELSH MINES PRESERVATION TRUST

see cover photograph

The Welsh Mines Preservation Trust has been set up recently in an attempt to meet the challenge of rapidly decaying metal, slate and coal mine sites in Wales. Hundreds of sites are now in a very neglected state but some of the best and earliest Boulton and Watt and Cornish engine houses still survive, although nearly all are in a very ruinous and desperate condition. Wheelpits, crusher-houses and other structures are also at risk.

Fortunately, the importance of these memorials to the mining industry is now becoming recognised and a number of engine houses in particular have been Listed or Scheduled, although regrettably this does not address the immediate and crucial problem of natural decay.

The aims of the Trust include the raising of funds to implement repairs and consolidate structures, and liaising with landowners, local authorities and other bodies. Where possible, the final aim will be to make the sites accessible to the public, to enable a proper appreciation of their historical significance and to ensure the maintenance of their fabric in the long term. The Trust can be contacted through the Honorary Secretary ☎ 0606 889325.

CRUX EASTON WIND ENGINE

The Crux Easton wind engine, constructed by John Wallis Titt of Warmminster about a hundred years ago, has recently been listed. It is still on its original site in Hampshire (SU 425 564), eight miles south of Newbury, off the beaten track, which is no doubt why it has survived and is now the only known example of its model. Its importance is that it represents the transition between traditional windmill technology and the fixed sail 'prairie type' wind pump.

It is a 20 feet diameter 'Simplex' self-regulating geared engine on a 32 feet hexagonal skeletal steel tower. It drove a pump and ground corn for the farm. It had 48 canvas annular sails all of which were removed at least

AIA RECORDING AWARDS FOR 1992

These Awards have now continued successfully for nearly a decade. The last year has been noteworthy for much good publicity for the Awards and the Association, especially in two publications central to practitioners of more 'conventional' archaeology: the Council for British Archaeology's *British Archaeological News* and the popular magazine *Current Archaeology*. The future of the award looks secure. One entry for next year has already been notified from an amateur group working on warehouses in Manchester. With groups such as this and AIA members such as Ron Martin who won both fieldwork awards last year, the place of the awards within the Association is ever stronger. However part of the value of the awards is that the AIA is now seen to be promoting improved fieldwork in industrial archaeology generally. Please do enter, or encourage others to enter, any work that contains an element of fieldwork and which you think deserves to be considered.

One of the most valuable types of fieldwork project that can be carried out in industrial archaeology is the comparative evaluation of a specific class of monument to assess the most important sites for strategic preservation and recording. The outstanding example, to date, of work to establish such priorities must be that on Cornish engine houses by Adam Sharpe, Rose Lewis, Chris Massie and Partners, with Nick Johnson, the Cornwall County Archaeologist. This received the main fieldwork award for 1992. The report was published in 1991 by the Cornwall Archaeological Unit and will form one of the most valuable works of guidance for the Monuments Protection Programme of English Heritage. The project was a large undertaking on a building type of exceptional archaeological significance and in an area of great importance in the Industrial Revolution. The markings for each site gathered under the title of Monument Importance Value and Site Management Appraisal Value are of much greater significance to industrial archaeological studies and conservation than either engine houses or Cornwall, important as these are, and should be studied by everybody working in industrial archaeology.

Peter Hughes' study of the huge 'abbey-like' structure of Ty Mawr ('Great House') at Ynys-y-Pandy is a masterly analysis of this classic industrial archaeological site. This study was carried out in Peter's own time, and at his own expense, and shows how each of the components of a complex site can be recorded and the results obtained presented in graphic and written form with great clarity. The judges had no hesitation in giving the award for the most enterprising fieldwork award for 1992 to Peter Hughes.

Entries for the 1993 Fieldwork Awards should be sent to



A wind engine similar to that at Crux Easton, from the John Wallis Titt catalogue of 1905

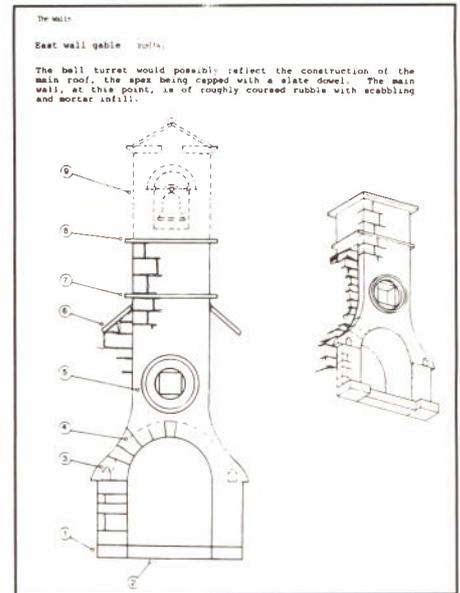
thirty years ago, but several of the metal parts from the sails have been found in the ground, which will help with restoration. The sails, each five feet in length, were adjustable and a fan tail allowed the engine to turn into the wind.

What remains is the cast iron hexagonal base, with the tower, the wheel which contained the sails, the gearing, and metal parts of the fan tail. Adjoining is the brick building which housed the mill stones, the water pump and a 500 feet well. There is a flywheel for a belt drive to an adjacent lean-to, either to drive the saw bench there or for an oil engine to drive the pump after the wind engine stopped working.

The tower is in such a state that it could not survive many more years and it is the ambition of the Hampshire Mills Group to restore it to working condition. The owners and the local conservation officer are keen on the long term project being carried out, and the building is subject to a grant for its preservation.

Ken Major recorded the engine some twenty years ago and wrote a paper on *The Wind Engine of John Wallis Titt* in 1977 (see also his Rolt Memorial Lecture in *AIA Review* Autumn 1991). On his recommendation, the Group has obtained copies of original drawings from Wiltshire Record Office and Warminster Museum which will be invaluable in the restoration. Members have also searched together with the Hants Metal Detector Group for parts which have become buried below the wind engine, and have recovered many small parts of the sails.

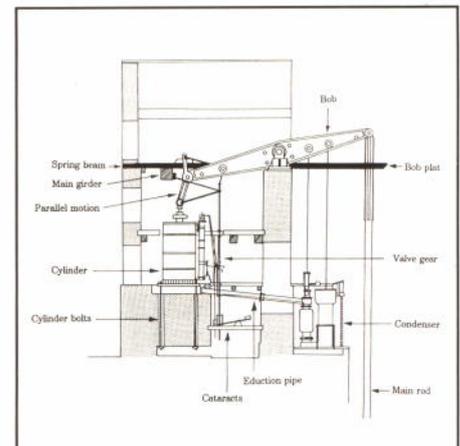
Tony Yoward



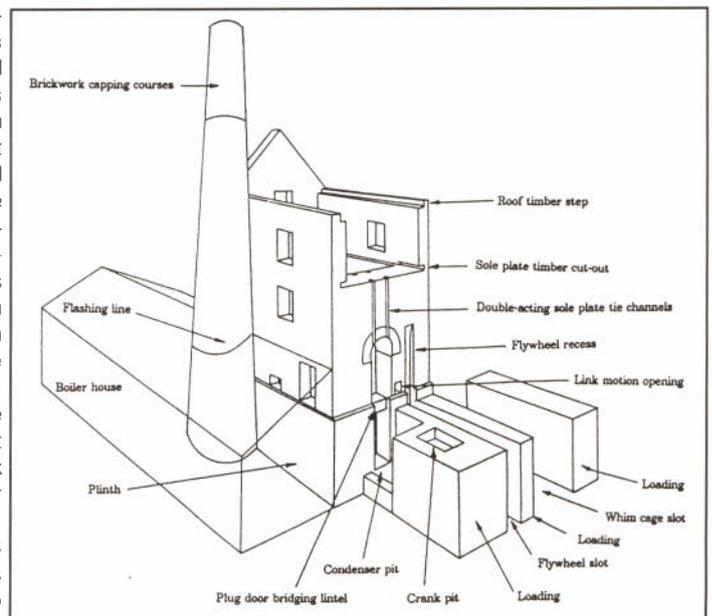
Part of a page from Peter Hughes's winning entry for the AIA Fieldwork Initiative Award

Stephen Hughes at RCAHMW, Crown Building, Plas Crug, Aberystwyth, Dyfed SY23 2HP (☎ 0970 624381) by 1 May. Entries may be copied for the National Monuments Records or illustrations used to publicise the winning awards. Please send in entries in any form, they will be accepted as long as they contain an element of fieldwork.

Stephen Hughes



above and below: Two illustrations from the winning entry on Cornish engine houses for the AIA Fieldwork Award



NOTICEBOARD

MISCELLANEOUS MINES

A bibliography of published works relating to those many miscellaneous mines and quarries worked for substances other than fuels or metals is being compiled by Paul Sowan in collaboration with Andy Bowan. The bibliography already runs to 171 pages and continues to grow. It contains all published works, contemporary or historical, from the earliest until the end of 1991, including major articles from technical journals, Acts of Parliament and geological literature. The geographical scope of the project includes England, Wales, Scotland, the Isle of Man and the Channel Islands. Little has so far been located for Ireland. The scope of the minerals considered is determined by their end use. Anything used for fuel or reduced to a metallic state is excluded; but the miscellaneous minerals that remain provide fascinating subjects for study and have been somewhat neglected in the past. For example 'Bideford Black' is included, an impure anthracite used for painting ships' bottoms. Assorted hydrated oxides of iron whose end use was for pigments are also included, as are the Surrey hearth stone mines.

Anyone willing to help with the project, especially by searching obscure or locally published journals, booklets, caving periodicals etc, should contact Paul Sowan, Subterranea Britannica, c/o CNSS Ltd, 96a Brighton Road, South Croydon, Surrey CR2 6AD.

right: The converted warehouses at Gloucester Docks; see the report *Heritage Management Conference*, page 4
Photo: Peter Neaverson

DIARY

10 December 1992

UNDERSTANDING ARCHAEOLOGICAL EVALUATIONS

Day school organised by Clwyd Archaeology Service. Details from Sue Haygarth, Clwyd Archaeology Service, Department of Development and Tourism, Clwyd County Council, Shire Hall, Mold CH7 6NB ☎ 0352 704015.

6-8 January 1993

RESCUING THE HISTORIC ENVIRONMENT

Conference on the relations of archaeological heritage management and nature conservation. Details from Mrs Kate Penny, Professional Development Unit, University of Leicester, University Road, Leicester LE1 7RH ☎ 0533 522464.

8-10 January 1993

ARCHAEOLOGY AND STANDING BUILDINGS

Symposium on techniques and applications, at Chester, organised by the Institute of Field Archaeologists. Details from Mrs Leslie Crombie, Centre for Continuing Education, University of Liverpool, PO Box 147, Liverpool L69 3BX.

27 February 1993

SUBMERGED SETTLEMENTS AND SHIPWRECKS

Seminar at the Royal Archaeological Institute on the present state and future prospects of archaeology underwater. Details from Mrs W E Phillips, Assistant Secretary, Royal Archaeological Institute, c/o Society of Antiquaries, Burlington House, Piccadilly, London W1V 0HS.

LETTERS

In the last issue Dr Chris Lewis wrote about the attitude of the late Professor W G Hoskins to industry, showing that the widespread view that he disliked industry is ill-founded. Derek Bayliss adds:

In 1958 Hoskins gave a series of five lectures on *The Midland Landscape* at Oxford. The fourth was devoted to the industrial landscape, and he certainly showed no lack of interest in it. The lecture was illustrated by slides—the first time I had seen this at an academic lecture. I remember that one was of a horse gin at an east midland colliery.

The emphasis at Oxford at that time was strongly on political history, at least in the modern period. People who proposed research topics in nineteenth-century social or economic

history were routinely turned down by the Faculty of History and pointed towards the Faculty of Social Studies. My interest in industrial and transport history on the ground, encouraged by teachers in Derby, found no stimulus at Oxford apart from Hoskins' lectures and summer excursions with the History Society (memorable occasions), and the sympathy of my tutor John Prest, who had written *The Industrial Revolution in Coventry*.

Hoskins was not alone in disliking London and some aspects of the twentieth century. Even now, how much industrial archaeology is done in the great conurbations, and how much in the industrial countryside or even rural areas? People are entitled to their preferences.

Derek Bayliss



20 March 1993

NEW RESEARCHERS IN MARITIME HISTORY

A day conference at the National Maritime Museum. Details from Dr Roger Knight, New Researchers Conference, National Maritime Museum, Greenwich, London SE10 9NF.

23-25 April 1993

AIA AFFILIATED SOCIETIES WEEKEND

At Coalbrookdale. See the Affiliated Societies Spot for information. Further Details will be circulated to members.

23-26 April 1993

NATIONAL ASSOCIATION OF MINING HISTORY ORGANISATIONS 1993 CONFERENCE

In the Isle of Man. Details from Rachel Robertson, 11 Western Avenue, Ballabrookie, Douglas, Isle of Man ☎ 0624 674702.

8 May 1992

MANCHESTER DOCKS TO SALFORD QUAYS

Day-school at Manchester Metropolitan University. Details from D D Brumhead, Gayton, Laneside Road, New Mills, via Stockport, SK12 4LU.

10-12 September 1993

AIA ANNUAL CONFERENCE FOR 1993

At Ambleside, Cumbria, with an additional programme 8-10 and 12-14 September. Details will be mailed to members in due course.

Information for the diary should be sent to the Editor as soon as it is available. Dates of mailing and last dates for receipt of copy are given below. Items will normally appear in successive issues up to the date of the event.

AIA Bulletin

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Final copy dates currently are as follows:

30 September for November mailing

30 December for February mailing

30 March for May mailing

30 June for August mailing

The AIA was established in 1973 to promote the study of Industrial Archaeology and encourage improved standards of recording, research, conservation and publication. It aims to assist and support regional and specialist survey and research groups and bodies involved in the preservation of industrial monuments, to represent the interests of Industrial Archaeology at national level, to hold conferences and seminars and to publish the results of research. Further details may be obtained from the Membership Secretary, Association for Industrial Archaeology, The Wharfage, Ironbridge, Telford, Shropshire, TF8 7AW, England ☎ 095243 3522.

The views expressed in this Bulletin are not necessarily those of the Association for Industrial Archaeology.