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Steam Holidays Afloat. The single-hatch steam coasters which used to be a familiar sight on the Clyde and Western Isles of Scotland, puffing along with cargoes of building material, coal, barley and household effects or beached at some remote settlement unloading with their single derricks have all but disappeared, their business taken over by motor lorries now that the many ferry crossings on Scotland's west coast have roll-on facilities for large commercial vehicles. 'Puffing' was their most memorable feature; in their heyday most of these utilitarian vessels were fitted with non-condensing engines, for simplicity of maintenance and to save the space which a condenser would occupy in a vessel limited to 88 ft length (to fit the locks of the Crinan Canal). Now the characteristic sound and sight of their exhaust steam has all but disappeared, with a few more modern oil-engined versions of the same type still plying on route from Glasgow as far north as Skye.

Like other well-tried merchant ship types, the Clyde puffer design was taken up by the Ministry of Transport during World War II for naval use, and the versions built to Ministry specification to victual warships at anchor survived longer than most of their civilian counterparts. Designated in Admiralty jargon as Victualling Inshore Craft, they worked in and around the naval ports until the sixties, and many remained laid up in obscure corners of the dockyards until preservationists lit upon them in the seventies. But of the several available for private preservation, many were too dilapidated for restoration. The story is told of one such **VIC** acquired for preservation on the Severn. One of the exceptionally dry summers of the mid-seventies left the water level in the river very low, such that there was a danger of the little steamer grounding above Worcester on her way up to her new home. The enterprising owner landed all the coal and emptied the boiler to reduce the draft and proceeded to his destination with a small compressor on deck supplying air to work the compound engine!

Nic Walker is a young man from Uxbridge who acquired one such puffer and has put her to work again. **VIC 32** was built in 1943 for Admiralty use, but her erstwhile cargoes of ammunition, bread and sailors' mail have now given way to 12 passengers who come for a week's leisurely cruising among the Western

Isles, helping with handling the ship and stoking the boiler while Nic's wife Rachel produces memorable Scottish meals from the

sixties were only one of the factors which led to the decline of London's docks. Others include the increase in the size of ships which



VIC 32 at Dunardry Locks on the Crinan Canal

Picture by EW Paget-Tomlinson

little galley. Sensitive conversion of the vessel's hold space into six snug cabins has avoided spoiling her traditional profile. Joining and leaving point is usually Tarbert on the Kintyre peninsula, readily accessible from Glasgow although some trips are also programmed for the Caledonian Canal, when the base port is Corpach.

Prices vary from £95 to £130 per week, with lavish Scottish meals and the promise of some of the most magnificent and regulated scenery in Britain. Steam enthusiasts will soon find themselves with a shovel in their hands, learning that firing is not just a question of chucking on coal with gay abandon, an approach that would choke the fire as well as asphyxiating anyone on deck. If you would like an unusual holiday and the satisfaction of helping to keep the **VIC 32** in steam, write to Highland Steamboat Holidays Ltd, Crinan, Lochgilphead, Argyllshire, Scotland.

Survey of London's Docks. The widely publicised labour disputes of the fifties and

made it increasingly awkward to get cargoes to the up-river docks, and the spread of motorways, which benefited London and Tilbury rather later than it benefited other parts like Southampton and Avonmouth. In 1976 the PLA published its Strategic Plan for the redevelopment of both banks of the Thames from the Tower to Barking Creek, an area in excess of 8½ square miles, and implementation is already under way, with expenditure of over £430 million budgeted for the next 3 years. New homes, factories, roads, parks and other facilities are replacing the superseded dock installations, and members of GLIAS have taken a lead in recording significant features of the dock estate before they disappear. A Docklands History Group has been formed to co-ordinate efforts in this urgent task, whose role will include informing and advising local authorities and developers involved in redevelopment as well as encouraging research and recording and keeping the public informed of its findings.

Dr Robert Carr has been appointed the

first full-time survey officer answerable to the DHG and based at the Department of Civil Engineering at the North East London Polytechnic, Forest Road, London E17 4JB. Dr Carr has provided the note which follows:—

Until the 1860s the Thames was a major shipbuilding river. Many of the yards were situated on the Isle of Dogs. From that time iron shipbuilding on the Thames became uneconomic and activity shifted to the Clyde and Tyne, where raw materials such as coal and iron were close at hand. Shipbuilding on the London River all but finished in 1912 with the closure of the Thames Ironworks at Canning Town. Since then, apart from the building of very small vessels, only repair work has been carried out.

The nationalised company River Thames Shiprepairs Ltd (RTS) was formed about two years ago, taking over three up-river ship repair yards — Royal Albert Dock (formerly owned by R & H Green and Silley Weir Ltd), Blackwall Yard (also of that company. This yard dates from 1661), and Prestons Road (formerly

be in Docklands. Ironically by that time most of the machinery of the area would have gone for scrap. Hopefully the lesson learnt on the Thames will inspire efforts to set up a ship yard museum on the Clyde or Tyne.

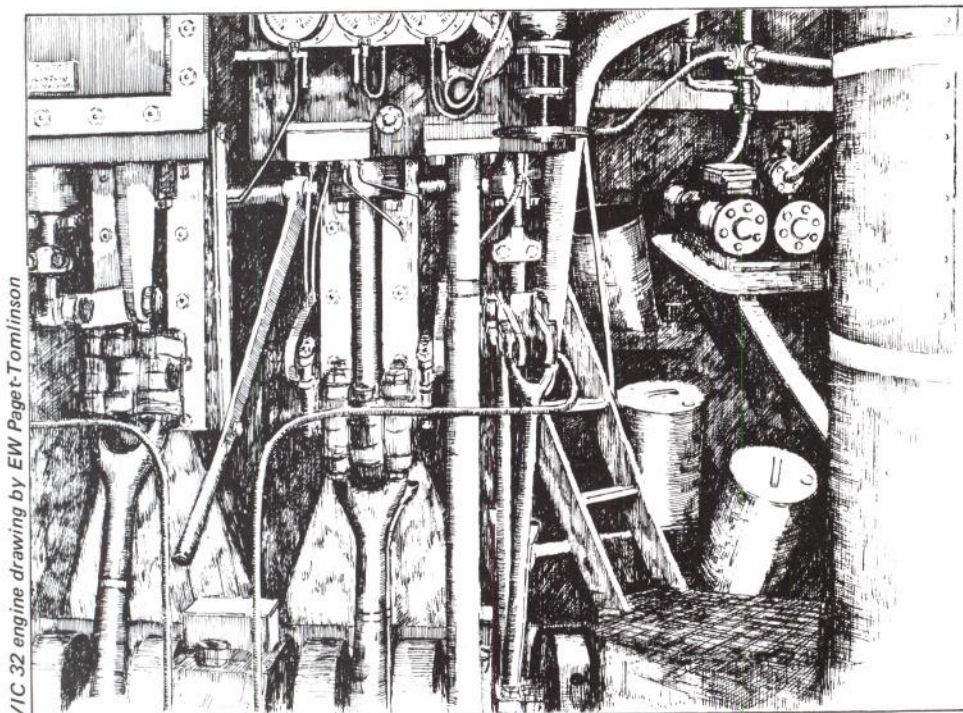
R J M Carr

Reports from Specialist Discussion Groups. A new feature of the 1979 AIA conference at Ironbridge was the division into specialist discussion groups on the Sunday morning, each of which was charged with reporting back to the membership their findings on a number of important matters affecting the development of ia. The range of alternative attractions in the Gorge, in particular a demonstration of coracle-building and paddling on the Severn by Eustace Rogers, resulted in many members not bothering to turn up for the meeting they had asked to attend. But during the short time available following the AGM later in the morning, brief reports from the various groups were presented, and several of the Chairmen have agreed to summarise their conclusions for the Bulletin.

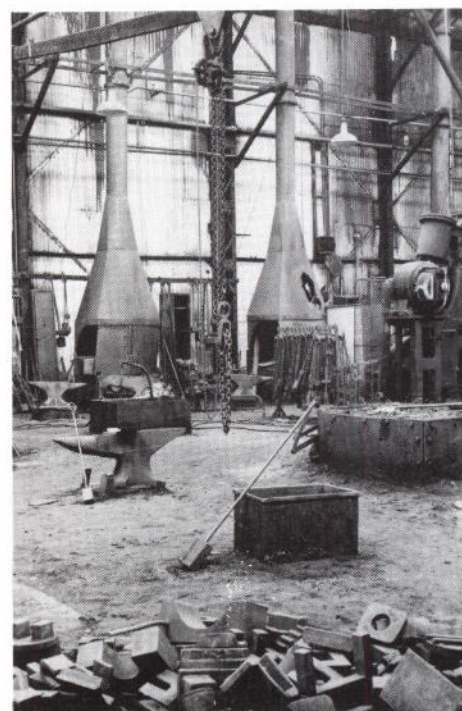
archaeological excavation for fear that a subsequent mishap on the site might land them in the dock as having approved the excavation arrangements. The wider powers of New Town Development Corporations, which can pursue positive and innovative policies of architectural and industrial conservation without the constraining effect of an elected assembly to which they must answer, also came in for mention.

The achievements of Telford, Runcorn and Washington new towns in this respect show what can result from an unfettered approach, and it was hoped that the Urban Development schemes proposed for the dock areas of London and Liverpool would operate with equally free mandates and a similarly imaginative approach.

Twelve people met under Stuart Smith's chairmanship to talk about the **role of local ia groups**. Local societies with a general ia interest were seen to be in decline, with a trend towards groups devoted to the preservation of a particular site or the establishment of an industrial museum. Smaller groups feel isolated



VIC 32 engine drawing by EW Paget-Tomlinson



RTS Royal Albert Dock, blacksmiths' shop, May 1979

London Graving Dock Co) — and also facilities at Tilbury, Denton, Sheerness and Felixstowe. Over the years the up-river yards acquired machinery second hand from other Thames yards. Since then ship repairing facilities on the river have run down and all nationalised yards have closed. Dry dock facilities are no longer available on the Thames.

Initial recording work by the Docklands History Survey has concentrated on machinery as this is usually destroyed first owing to its scrap value. Scrap dealers are said to be giving £30 per ton for iron. With the closure of all the RTS yards efforts have been made to record at least some of the shops before the scrapping of the machinery. Any attempt to form a collection of ship-repairing machinery on the Thames is frankly unrealistic. Most plant is very heavy and could only reasonably be preserved in situ. The docklands areas which contain ship repairing works are at present too far from tourist routes to make the setting up of an industrial museum viable.

In the long term, however, if an industrial museum is set up in Greater London, it may well

One of the most well-attended groups was that on **practical aspects of preservation**. The group of 15 was chaired by Geoff Wallis of the Dorothea Group, who draw a distinction between 'preservation' a neutral activity in which industrial remains are retained so far as possible in their present condition, and 'restoration' which involves positive decisions on policy and standards. Various aesthetic and practical aspects were discussed, including the impact of the Health and Safety at Work Act on working preserved machinery. **The legal aspects of ia** were also the subject of another smaller group led by Peter White of the Ancient Monuments Inspectorate who drew attention to the additional powers to protect historic machinery contained in the new Ancient Monuments and Archaeological Areas Act of 1979. An important consequence of the Health and Safety at Work Act is that factory inspectors and fire officers may find themselves personally liable for the consequences of any accident which happens after they have inspected a building. One effect of this could be to deter inspectors from visiting the site of an

and the AIA was seen to have a role in helping to establish new societies, encouraging the fledglings and acting as a channel for the exchange of information between societies. Co-ordination of activities, advice on insurance and fund-raising and the supply of speakers at regional conferences were all seen as valuable, and it was hoped that local societies would continue to support regional meetings at annual intervals or more frequently. Specialist sub-groups devoted to a particular topic were also seen as useful; Professor Minchinton's offer to co-ordinate the establishment of such groups will have been noted in the previous Bulletin.

Dr Stafford Linsley chaired a group of eight people who looked at various aspects of **ia publishing**. The inclusion in the **IA Review** of articles on industrial archaeology outside Britain was discussed in detail; some members felt that the **Review** should concentrate solely on material concerning British sites, but Dr Linsley as Editor pointed out that a foreign market was vital if the **Review** was to flourish and this implied inclusion of foreign articles. The merits of publishing excavation reports of

sites as against general articles on policy, Legislation, migration of technologies and other matters with a wider bearing were also discussed, with members agreeing that excavation reports might appropriately appear in the journals of local societies but that they might thus miss the wider audience they deserved. There was general agreement that the **AIA Bulletin** was a more appropriate medium than the **Review** for ephemeral notices and brief news items.

Marilyn Soden chaired a small group of 4 who looked at the **preservation of records, films and tapes**. Tape and film archives were seen to present particular problems of conservation, cataloguing and public access, but opinions differed widely as to how well professional bodies such as the Library Association, Society of Archivists and British Institute of Recorded Sound are coping with these new media. The Chairman, from her standpoint as Librarian to the Ironbridge Gorge Museum, defended the record of

members from overseas, Mr van Ouden from Holland and Mr Purkis from Australia wondered why no qualitative assessment of the significance of a site was required on the card. Envious mention was made of the standards achieved by the Historic American Engineering Record in the USA, but much could be achieved within the present CBA format, in the group's opinion, with better training in how to fill them in.

Fund raising attracted only 3 participants, with another staff member from Ironbridge, Mark Harwood-Little, in the chair. It is regrettable that his specialist knowledge of this hazardous but potentially very fruitful field could not be shared with more people.

Techniques of generating interest in would-be donors were discussed, as were ways of handling offers of help in kind rather than cash from industrial companies. Lotteries are a new feature which extract money from a section of the public not normally disposed to contribute to charitable causes; their effectiveness is

conference is to continue to have a useful role, then positive proposals worked out in committee in this way are at least as important as the illustrated formal lectures which suffer no such problems of poor support.

An experiment in Iron-Age Smelting. L D W Smith and J R Brookes write as follows:—

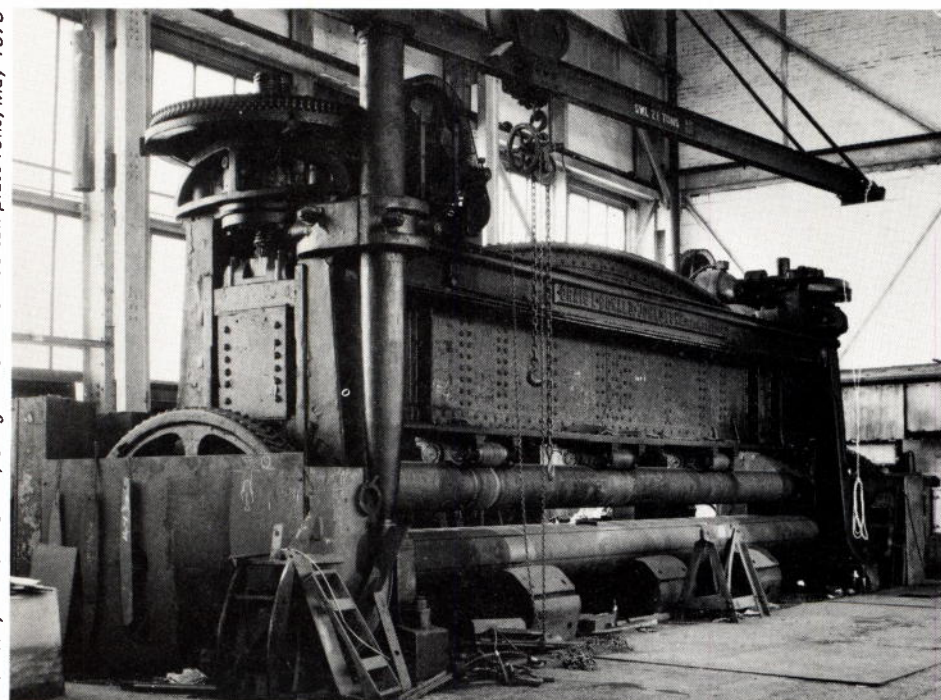
Two bowl furnaces were fired experimentally on the 14th and 15th of September to coincide with the AIA Annual Conference held at Ironbridge Museum. The experiment was conducted by the authors and Mr R McLean. Bowl furnaces are defined as those in which no provision exists for tapping slag during the process of reducing the iron ore. They are contrasted with the various forms of shaft furnace familiar in the Central European Iron Age and later introduced into Britain probably by the Roman Army. They are also characterised by dependence on assisted blast of considerable force. This interim report describes the experiment and its archaeological implications. At the date of writing the chemical and metallurgical analyses of the furnace contents are not yet available.

The two furnaces in the experiment were identically designed. The intention was to charge and fire them identically, to open furnace 1 to extract any ferrous mass or bloom for forging while hot, but to allow furnace II to cool naturally for several days after firing. This was in order that it might be sectioned and its contents drawn in situ before disturbance.

The furnace design was based on archaeological evidence for simple furnaces of the Iron Age in Britain, adapted to the condition of the ground at the experimental site, and following the laboratory experiments conducted by Wynne and Tylecote (1958) which investigated variables in the management of small bowl furnaces of 9" diameter. The present experiment was based on their optimum results scaled up for an 18' diameter furnace fired under field conditions.

A hemispherical pit was dug for each furnace and lined with clay 2" thick. This clay lining was then continued above ground level to form a cone with its centreline inclining about 10° out of vertical. The best archaeological evidence for iron furnaces in Iron Age Britain is found in the work of Jobey (1962) and Fox (1955). Jobey interpreted the evidence of his excavated superstructure fragments from two furnaces as open-topped hemispheres, and Lady Fox observed the clay lining of the bowl part of similar furnaces not cut into a rock surface. The present reconstruction started with a combination of these two features. From Jobey's article, however, it appears that his interpretation of a dome shape was conjectural. He writes: "The lining did not appear to have come from the tuyeres alone, since little curve showed on the inner vitrified surfaces. In all probability there had been clay domes designed to achieve higher furnace temperatures which had been broken and fallen into the bowls when the blooms were removed. An opening in the top of each dome would have been necessary to allow gases to escape and to feed additional charcoal into the furnace". In the present experiment a conical shape was preferred to Jobey's dome, because it is easier to construct, less likely to create voids as the charcoal burns and settles, and is not inconsistent with some modern primitive practice.

When the body of a single tuyere furnace is much wider than its top aperture there appears



pictures by RJM Carr

professional archivists in looking after tapes and film archives. She felt that little would be gained by setting up a specialist group within the AIA devoted to questions of archive preservation, since this would duplicate work already being done elsewhere; on the other hand a group prepared to list and collate archives with special relevance for industrial archaeologists **would** have a useful role, in her opinion.

Bill Thompson chaired a group of 8 discussing **record cards and recording**. A short paper by John Crompton on CBA record cards was the starting point, and it was agreed that with slight modification the CBA card would form an adequate first record, although members agreed with Douglas Hague that the layout of the National Monuments Record Card was more satisfactory for recording in greater detail. John Crompton introduced his list of instructions on how to complete the CBA card, compliance with which would do much to improve the standard of recording, and members agreed that the inclusion of clear black and white photographs of A8 size (2" x 3") was desirable. Two

illustrated by the success of the Hereford Cider Museum in financing many of its initial activities prior to opening from a local lottery. The policy of the present Government in encouraging private patronage for the arts and shifting financial burdens away from the State was seen as an added reason for organising fund-raising on a sound, effective and business-like basis.

Most groups agreed that the hour available for their deliberations (less where they failed to meet up promptly) was insufficient, but that they hoped to see similar meetings as a feature of future conference programmes. The group chaired by Geoff Wallis recommended in particular that the meetings should take place earlier in the weekend to allow more time for continuing the discussion over meals and between the formal sessions. Subjects suggested for future treatment included presentation of industrial history, the use of volunteers, and safety on sites and in working museums. With less beguiling weather than we enjoyed at Ironbridge, the specialist discussion groups might attract a better attendance; if the annual

to be a tendency for the burning mass within the charge to migrate sideways as it descends towards the tuyere, leaving a dead zone on the opposite side. Gilles (1958) found this in his experimental firing of a wide-bodies shaft furnace in which the inward inclination of the upper part of the sides was only about 20° from vertical. A basic problem in furnace design, whether bowl or shaft, appears to be how to keep the ore away from the oxidising region at the tip of the tuyere, when this tendency exists for the furnace contents to slip diagonally towards it. Ideally the ore should remain at a distance at which it would only be exposed to reducing conditions. In other words, it should remain in the part where the CO_2 has been burned to CO . In a shaft furnace the pre-positioning of ore in a desired position is impractical, and a mixture of fuel and ore must be charged, over the descent of which the ironmaker has little control. Gilles reduced only 22% of the iron content of his ore. Much of the remaining 78% may have been reoxidised in the tuyere region.

In the simpler and smaller bowl type of furnace pre-positioning of the ore is possible, and offers a chance of keeping the bulk of the ore in a position remote from the oxidising region; but this will only work if a flow of gas horizontally can be achieved. In the present experiment horizontal flow was encouraged by introducing the tuyere at a sharply downward angle of 45° , indicated as the most effective in Wynne and Tylecote's results (1958). The conical superstructure was also distorted to lean away from the tuyere with the idea that gas flow through the ore heap at the rear of the furnace would be encouraged by positioning the top aperture over it.

After construction, furnace I was allowed to dry naturally for three days and furnace II for six days. They were then further dried by means of small bonfires inside and around them.

The Tuyeres were formed of the same local (Broseley) clay as the furnaces, but fired in a kiln before use. They were 10" long, $3/8$ " in wall thickness, tapering from 3" to $9/16$ " in diameter.

In furnace I a 3" bed of charcoal (passing a $5/16$ " sieve, with the finest dust blown away) was formed as a porous sump to receive molten slag. A heap of 24 lbs of calcined ore (hydrated ferric oxide from the Bridge and Geddington faces of the Glendon Quarry, Northamptonshire; 30.9% Fe before calcining; 41.5% after; graded between $1/2$ " and $5/16$ " sieves) was put in against the side of the furnace away from the tuyere, sloping at its natural angle of repose. The remainder of the furnace void was then filled with (similar) charcoal fuel, and the furnace was lit and blown. Blowing was continued at 11.2 cu ft of air per minute for 7.4 hours. As the charcoal burned away it was continuously replenished. 39.6 lbs of charcoal were added during the firing.

It became evident during the firing of furnace I that an insufficient temperature was being reached, and that the gas current was failing to run through the ore heap as intended. Possible causes of difficulty were the use of fine charcoal in the initial bed, causing clogging; the shallowness of the bed; the cracking of the tuyere at the point where it entered the furnace, causing the blast to fan out and burn through in a direct route to the top aperture; and the cracking and leakage of gas from the furnace, despite the constant smearing of fresh clay into the cracks as they appeared.

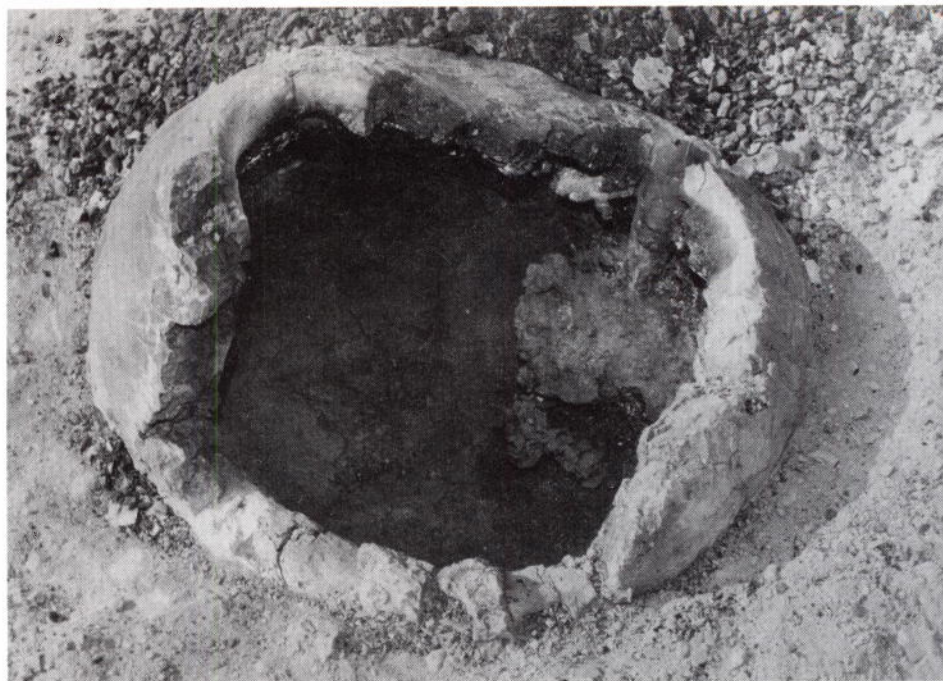


Plate 1 Furnace 1 after removal of loose contents

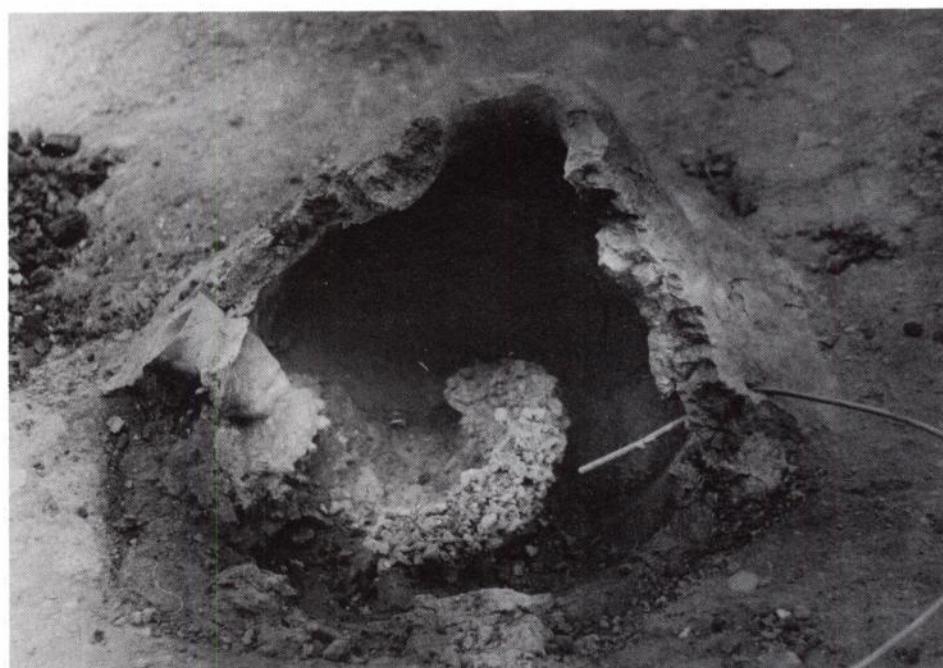


Plate 2 Furnace 2 after removal of loose contents



Plate 3 Experimental apparatus in use on Furnace 2

Most cracks appeared in the hottest part of the furnace near the tuyere. The leaking gas must therefore have tended to escape before the bulk of its CO₂ had been converted into CO. If the remaining CO₂ was converted, this loss of the oxygen-rich part of the furnace atmosphere would presumably lead to the increase in volume of the CO zone, though at a lower pressure and with less agitation of the furnace contents. The pressure must have been reduced, since the air input flow was constant. It remains to be established whether the consequence of pressure and agitation loss was (a) a failure to produce the CO₂→CO reaction, or (b) an increase in the CO zone in the furnace but a failure to produce the Fe₂O₃→Fe reaction despite this.

Despite apparent failure, it was decided to keep to the experiment programme and open furnace I as planned, but to make improvements in the management of furnace II if possible. When opened immediately after the cessation of blowing, the loose contents of furnace I were found to include small amounts of slag, much unreduced ore, some ore rendered slightly magnetic, but no recognisable cinder. The fused structures were a mass of cinder adhering to the tip of the tuyere and a small mass of ferrous material, mildly magnetic, beneath the cinder (Plate 1).

Furnace II was fired on the following day. This time the bed of charcoal put in initially was increased to 6" in depth, and consisted of 2" lumps with no finer material. The charge of ore was similar to that in furnace I. The charcoal fuel was similar except that the dust below 1/8" was sieved out. The casing of the furnace behaved very much better, very few cracks forming, and the outside remained cool enough to touch briefly at all times. The tuyere cracked and part was at one time removed momentarily with the intention of replacement, but this was decided against when the tip, remaining in position, was seen not to be clogged. Despite the cracks the tuyere appears to have functioned as required. Only one of the three thermocouples worked correctly, indicating a temperature of about 900° at the back of the ore heap during most of the blowing period. In 5.5 hours at the same blowing rate 53 lbs of charcoal were consumed. This consumption rate is consistent with the expectation assuming that all the O₂ in the blast was converted to CO within the furnace.

Furnace II was allowed to cool naturally and half of the top casing was then taken apart. Unlike that of furnace I, the casing proved to be very cohesive and difficult to break in a controlled manner. The contents were measured and drawn in section as uncovered. The loose contents included charcoal at the top and a mixture of ore and charcoal in the position of the original ore heap. The fused structures consisted of a cinder mass near the tuyere tip; a vitrified deposit within the surviving tip of the tuyere, of which about 1" had burned away; a pool of vitrified slag at the bottom; and a large crescent shaped mass of magnetic material, spongy but well fused, standing upright at the foot of the original ore heap (Plate 2). If successfully moved, furnace II will be exhibited in the Museum of Iron at Coalbrookdale.

The experiment apparatus is shown in Plate 3. The furnace is in the left foreground. The air blast to it is supplied by a 'Goblin' vacuum cleaner fan, controlled by a gate valve and measured with a venturi flow meter. The temperature is being measured by thermocouples connected to a chart recorded in the back of the van.

A fuller description of the experiment with results will be published when an analysis of the furnace contents is received.

Further archaeological evidence for the superstructure of bowl furnaces would be welcome. Doubts were felt about the correctness of a dome shaped superstructure, and the conical shape tried was also not entirely satisfactory. The inward leaning furnace wall encourages a dead space to develop. This might be an advantage but the slope inwards must not be at a shallower angle than the angle of repose of a heap of charcoal or charcoal and ore mixture. A shallower angle creates voids as the charge settles, encouraging the gas flow to bypass it unless it is continually tamped during firing. Some form of shelf or hopper, as used in many modern primitive examples, would also be very desirable for ease of feeding. Feeding through a 4" hole proved to be very troublesome.

In the archaeological excavation of a bowl furnace with one tuyere the most informative section would be taken on the tuyere axis. The position of the tuyere would tend to be detected from the orientation of the furnace contents. Although any ferrous remains would have been extracted as far as possible by the ironmaker, one might find traces of unreduced or partially reduced ore opposite to the tuyere, and a concentration of more vitrified cinder in the vicinity of the tuyere. The use of a small magnet to sense differences in the surviving ferrous content of the slag and cinder might be tried. The contents of an actual furnace are likely, however, to have been so disturbed by the ironmaker searching for ferrous residue that little other than the central pool of slag would survive in position.

The bowl itself may preserve an indication of the tuyere position. In the experiment a difference was noted in the intensity of firing of the clay lining. Greater vitrification occurred on the tuyere side. In furnace I, in which the required temperature was not achieved, the side of the bowl opposite to the tuyere remained unfired. The vitrification of the two sides of furnace II was more equal but a difference was still evident.

The greatest contrast in vitrification occurred in the superstructure, the part overlying the tuyere in furnace II being fired to a mid-grey colour. Its outside surface retained the orange colour of the original clay, and its inside surface was fired black and coated with a blue glassy cinder. Opposite to the tuyere the superstructure was still pale orange throughout at the end of the firing.

An upright stone or a little shield wall might be built to protect the bellows of a furnace from heat and sparks. The stones interpreted as 'bellows rest' by Lady Fox (1955) might be the remains of such a wall.

The drying of the ground beneath the furnaces occurred unequally. Drying penetrated about 3" into the ground on the tuyere side but did not occur noticeably on the opposite side. This drying effect did not, however appear sufficient to leave any long-term archaeological trace.

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Research Enquiry. C E M Fyson who looks after the Newcomen Memorial Engine preserved at Dartmouth, is anxious to trace details of the firm started by his great-great uncle at Soham in Cambridgeshire early in the 19th century. Richard Fyson is thought to have begun as a millwright. In an advertisement of October 1848 he offered 'Windmills built in a superior manner; patent sails made upon a new and approved principle'. At the same time his engineering capabilities extended to steam engines which he undertook to 'erect and apply to any kind of machinery'. By 1894 the firm had designed and produced its own steam traction engine, incorporating new and improved principles, production of these continuing until 1924. The founder's great-great nephew would like to know if any of these Fyson traction engines survive; details of any of Richard Fyson's windmills surviving in working order (some of which are already documented) would also be welcomed. Write to Mr C E M Fyson at The Haven, Kingswear, Dartmouth, Devon TQ6 0DF.

Evidence of London's Early Industries.

Demolition of London's 18th century Cutler Street warehouses near Petticoat Lane, has provided an opportunity for archaeologists from the Museum of London's Department of Urban Archaeology to excavate the site and the results are yielding valuable evidence of 17th century industries associated with the slaughter of cattle. It appears that cattle at that time had horns pointing outwards rather than turned forwards and inwards as today. A series of rectangular pits lined with the core material from cow and bull horns are still puzzling the archaeologists, but other pits nearby were clearly associated with the tanning of hides. The dig has also revealed the remains of a kiln used for making clay pipes and evidence of glass-making industry. Rows of red-brick houses evidently once stood near where the cellars of the warehouses were subsequently built and these may have been one of the City of London's earliest suburbs. Following completion of this dig, the Museum of London's team is now working at Billingsgate on the site of a Saxon harbour close to the northern end of London Bridge, which the Saxons knew as the first and only crossing of the Thames in London. The nine archaeologists are working against a deadline of February 1980 when redevelopment of the site will go ahead. Important discoveries on the nature of Saxon harbour construction is expected to emerge from this excavation.

New £7,000 roof for Museum. John Townsend Honorary Curator of the Herefordshire Waterworks Museum, writes:—

A charitable trust was formed in 1974 to lease the Lower Pumping Station at Broomy Hill in Hereford primarily to preserve and restore the two unique steam pumping engines within, and to build round these a Museum of displays related to the supply and distribution of water.

The pumping station is mid-Victorian, parts dating back to 1856, and the Trustees immediately became aware that much of the slate of the roof was in bad condition. Piecemeal remedies were undertaken to replace missing

slates, but the situation gradually deteriorated until by late 1978 water was pouring down internal walls from perished lead valley gutters and there was an extensive area where gales had removed slates.

Not only were some displays ruined and much of the restoration work on machinery spoilt by rusting, but it was feared damage would inevitably take place to the timber structure of the roof and the wooden floors.

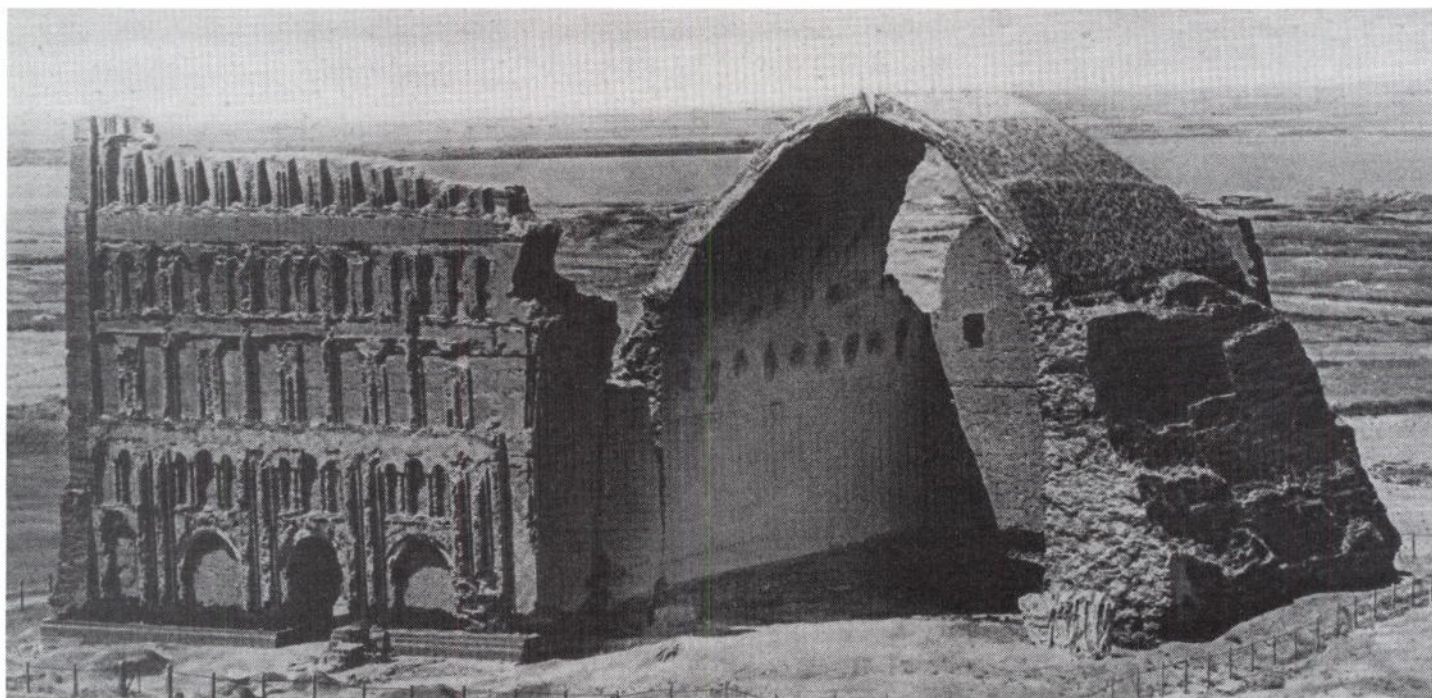
In order to secure the building against further damage it was judged necessary to completely re-slate, re-batten and felt, re-line the valley gutters, instal new gutters and downpipes and, at the same time, take the opportunity to treat the timbers with preservative. This work was originally estimated to cost £6,000 but the final total was £7,345 as it became necessary to replace structural timbers and to strengthen a ventilating lantern over the boiler house.

The Trustees had been quite unable to create a financial reserve towards such work as the cost of developing the pumping station into a

In addition five individuals contributed to make a total sum of £2,126 available, a figure which speaks highly of the generosity of those involved. As the Pumping Station is to be Scheduled as an Industrial Monument under the Ancient Monuments Acts, the Department of the Environment was approached. The Department was particularly sympathetic to the work of the Trust and agreed to give a substantial grant towards the cost of the work. Its inspectors making regular checking visits to the site. The Trustees accepted the tender of the Roundway Roofing Company of Southbank Road, Hereford. This firm was not only able to advance the work to have it completed before the winter of 1979-80 but were also extremely co-operative in appreciating the day to day problems of a wholly voluntary organisation and in maintaining the site in a tidy condition. Now that this critical work has been completed, it remains to make good the damage to interior decoration and rectify other less urgent deficiencies in the structure.

Taylor Woodrow International were technical advisers. The arch, generally stable despite its great age, forms the major attraction at this new complex.

Two New Youth Hostels. Pressure on accommodation in the Ironbridge area has been alleviated by the conversion of the old Coalbrookdale Institute, overlooking the Darby furnace site and the Great Warehouse, into a superior grade youth hostel with 60 beds, full meal facilities and the use of the adjacent Walker Study Centre with workroom and other facilities for organised field study parties. Bookings for the new hostel were already heavy before the opening date in April 1980 and it will enable students beyond daily travelling distance of Ironbridge to make a proper study of the many important sites in the area without having to rely on expensive hotel accommodation. The hostel is run by the Ironbridge Gorge Museum in conjunction with the YHA. It is difficult to imagine a more appropriate use for this striking



Aerial picture (by RAF) of Ctesiphon Arch

Museum, of putting the pumping engines back into working order (and of meeting the annual fuel costs to do this) had absorbed virtually all income from visitors and other sources. It was decided therefore to approach local industry in Hereford to see if it would contribute towards the cost. Chairman of the Trust, Stephen Southall, undertook to approach the more important of the business concerns in the City and the Trustees were particularly gratified by the response, especially in view of the current financial situation. The following companies either contributed directly or agreed to covenant donations over a seven year period:—

H P Bulmer Ltd
Chadds of Hereford Ltd
Chave and Jackson Ltd
Denco Miller Ltd
P & O Travel Ltd
Russell Baldwin & Bright
F H Sunderland
Sun Valley Poultry Ltd
Henry Wiggins & Co Ltd
Sid Wright Ltd

Mesopotamia's Monster Monument. The largest vault of unreinforced brickwork in the world, spanning over 80 ft and arching more than 115 ft above the ground, will shortly form the focus of a new tourist complex a few miles south of Baghdad in Iraq. The Arch of Ctesiphon stands on the east bank of the Tigris and is remarkable for having stood for more than 1,600 years, during which no larger unsupported brick span is known to have been constructed. It was evidently erected without falsework, each flat brick in the vault being successively cantilevered over the one below to form a tall elliptical arch, which once formed part of an impressive palace complex at Ctesiphon, now largely in ruins due to centuries of neglect and serious flooding by the Tigris in 1909.

The Iraqi Government, recognising the need for an alternative source of foreign exchange when the oil runs out, is developing its tourist attractions such as Nineveh and the Hanging Gardens of Babylon. Ctesiphon as one of Iraq's foremost archaeological sites has recently acquired a new museum building with swimming pool, restaurant and motel attached for which

building with its magnificent iron gates, erected in 1859 by local iron masters to provide literary, art and scientific classes for workers at the various foundries in the Gorge. Details and tariff are available from Youth Hostel Association (England and Wales) Midland Regional Group 116 Birmingham Road Lichfield, Staffs. Tel Lichfield 22279.

On the Staffordshire — Cheshire border a derelict water-powered silk mill is similarly being converted into a youth hostel with the help of a £24,000 grant from the Peak National Park. The mill at Gradbach in the Dane Valley parish of Quarnford is at least two centuries old. Following a bad fire in 1785 it was rebuilt in local gritstone with fireproof cast iron internal columns. Cheap silk imported from France in the 1870's brought about the mill's closure, but it was later re-opened as a sawmill and later as a joinery. When these activities eventually ceased, the surrounding cottages were abandoned and eventually demolished and the waterwheel removed for scrap, although the mill owner's residence has

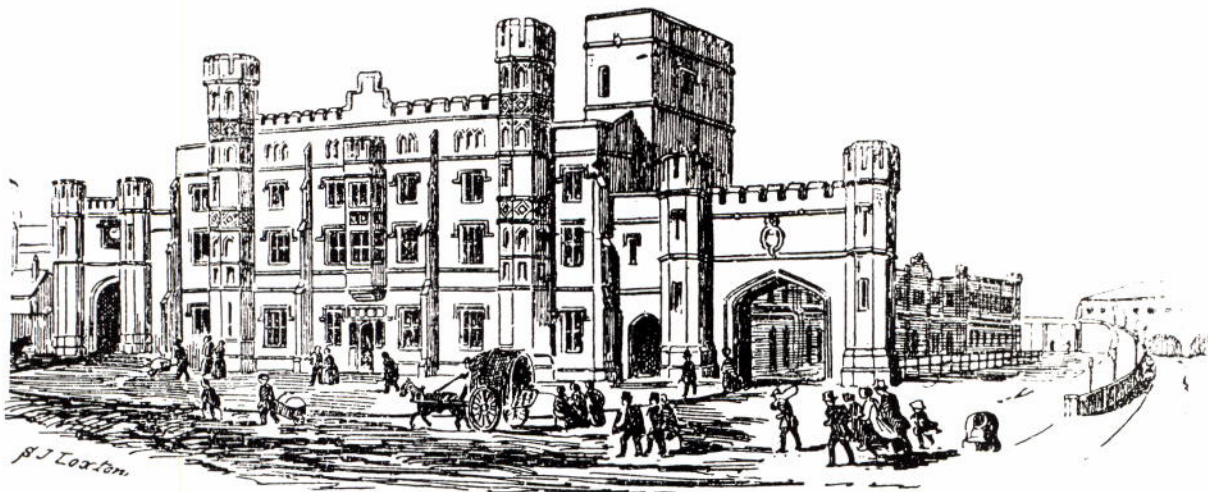
survived as a farm house. By next year it is hoped that conversion of the mill will be complete, enabling YHA members and others with a special guest pass to stay in this lovely and evocative corner of the Dane Valley which was once an important stopping place on pack horse routes and now illustrates an early stage in fireproof construction and the application of water power to silk manufacture.

The Great Railway Giveaway. The uproar last year over British Rail's application for consent to demolish Starcross Pumping Station, reported in Bulletin 6: 4, highlights the BR Property Board's dilemma in funding the preservation of railway buildings for which it has no further use. The AIA was among the bodies which protested at the scheme to demolish the red sandstone building at Starcross built in 1846 by Brunel to house one of the steam pumps associated with his South Devon Atmospheric Railway, and the building still stands. But BRPB cannot justify spending £100,000 or more on repairing the empty

in jeopardy. The railway board's offer does not extend to buildings with an acknowledged commercial value, such as rural stations suitable for conversion to residential use. Bath Green Park station is now set to become a supermarket, and old Bristol Temple Meads is the subject of a recently formed preservation trust. Other conservation groups with schemes for railway buildings in their area may now find it easier to take over the building and put their ideas into practice.

Register of Craft Skills. A report published in March 1979 under the aegis of the Civic Trust recommended the establishment of a register of craftsmen involved in building conservation so that architects and their clients could be put in touch with specialist firms of contractors and individuals with specialist craft skills. Sponsors of the report and feasibility study prepared by Nicholas Woodward Smith, included the DoE the Worshipful Companies of Carpenters, Ironmongers, Masons and Plumbers and the Crafts Advisory Council, and the latter organisa-

serious study. France was one of the only Western European nations not represented at the First International Congress on the Conservation of Industrial Monuments (FICCIM) at Ironbridge in 1972. Its successor at Bochum, West Germany in 1975 (SICCIM) welcomed one French delegate and by the time that TICCIM met in Sweden in 1978 the French delegation had multiplied to eight, its members taking a prominent part in the various international committees that ensued. No national association has yet been formed to coordinate industrial archaeology in France, but what may be considered in France as a lag behind other European nations in ia. activity was reduced recently when the eco-museum at Le Creusot launched a quarterly magazine called **Milieux** devoted to the history of technology, in particular its social aspects which are the particular concern of the museum. Topics to be dealt with in the first few issues indicate the emphasis on dialectics and broad theory which characterise French ia at present; titles of articles promised include 'Towards a genetic ecology of technological objects', 'The



THE OLD STATION, TEMPLE MEADS.

structure, one of 500 listed buildings in its ownership. The Board's Director of Environment, Bernard Kaukus announced recently that his Board would give away its historic buildings rather than let them crumble for lack of funds. Although they have allocated £1.5 million for environmental improvements, the sum required to properly repair all of the historic buildings in its care is nearer £100 million. Last year the world's oldest passenger railway station, Manchester Liverpool Road, was sold to the Greater Manchester Council for a token £1, with £100,000 contributed by BRPB towards its renovation in time for the 1980 anniversary celebrations. Now the Board would like to give away other properties which it cannot afford to repair, in the hope that local authorities and conservation groups can find a community use for them. Reaction from GLC's Historic Buildings Committee was immediate and adverse; its chairman Mr William Bell charged BRPB with abdicating its statutory responsibilities and setting a dangerous precedent which if followed by other public authorities in custody of historic buildings would place our architectural heritage

in jeopardy. The railway board's offer does not extend to buildings with an acknowledged commercial value, such as rural stations suitable for conversion to residential use. Bath Green Park station is now set to become a supermarket, and old Bristol Temple Meads is the subject of a recently formed preservation trust. Other conservation groups with schemes for railway buildings in their area may now find it easier to take over the building and put their ideas into practice.

tion is now seeking funds to enable it to operate such a register. The report (entitled 'A National Register of Craft Skills in the Building Industry' and available by post at £1.75 from Civic Trust, 17 Carlton House Terrace, London SW1Y 5AW) envisaged a comprehensive register of all skills likely to be required in building conservation, but for practical reasons it is intended to limit the scope initially to the more specialist craft skills, which are often the most difficult to locate, gradually extending the register as it becomes more firmly established. Further details are available from Helen Wilks, Conservation Section, Crafts Advisory Council, 12 Waterloo Place, London SW1Y 4AU.

New Journal Launched in France. Twenty five years have elapsed since Michael Rix's use of the term industrial archaeology in the pages of **The Amateur Historian**, and during that time ia. has firmly established itself as a field of both scholarly and popular study in Britain and North America as well as in many other industrialised nations. In France there was a prolonged reluctance to accept ia. as a legitimate field for

contribution of geography to ia.' and 'Cannibalism'. The new journal will be produced at Le Creusot under the direction of Marcel Evrard, director of the ecomuseum, and edited by J-C Beaune. Four issues are promised in 1980, at a subscription price of 85 francs. An inaugural issue is already available at 25 francs. Enquiries to 'Milieux', Ecomusee de la Communaute Chateau de la Verrerie, B P 53, 71202 Le Creusot, Cedex, France.

Croydon Steam Boot Factory. A photograph and brief report in Bulletin 6: 3 announced the listing of Cooper's Steam Boot Factory, once the largest industrial employer in Croydon. Derek Bayliss, who was keeping this under review, has since moved to Sheffield, but manages to keep in touch, and we learn from him via GLIAS Newsletter that in February this year the listed building consent to demolish granted by the GLC awaited ratification from the Secretary of State for the Environment. GLIAS and the Croydon National History and Scientific Society have combined in an outline recording exercise.

The Deterioration and Conservation of Porous

Building Materials in Monuments, a review of the literature by T Stambolov and J R J Van Asperen de Bor published by the International Centre for the Study of the Preservation and Restoration of Cultural Property, 00153 Rome 13, Via Di San Michele, Rome, Italy.

A highly technical description of the methods of cleaning discoloured stone work and methods of conservation.

The Crystal Gardens, West Coast Pleasure Palace

Pierre Berton, 1977, The Crystal Gardens Preservation Society, PO Box 1204 Victoria British Columbia. Built in 1925 as a glass and steel pleasure centre the Crystal Gardens survive to this day but are causing problems for the conservationists and the local council. This book is a splendid record of the construction and use of the centre, and has been produced specifically to arouse interest in the building.

Canal Books Robert Wilson of 23 Cecil Street, Rothwell, Northants produces a good range of pocket size books on canals. Two recently seen are **Tankers Knottingley** by Alan H Faulkner and **Epilogue** by Robert J Wilson. Both are priced at under a pound, and a full list of publications is obtainable from the publisher. The photographs are a little flat due to the printing process but the books are packed with useful information.

Waterproofing Materials for Masonry, NBS Technical note 883, US Department of Commerce, National Bureau of Standards Washington DC 20234, 1975, price \$1.45. A report, based on laboratory tests, concerning the correct methods of application of masonry waterproofing and the most effective methods of treating porous brickwork.

Railway Guides Shropshire County Library has published two further reprints of hand books to famous Shropshire railways. The first is on the Shropshire and Montgomeryshire Railway, first published earlier this century and the other the Severn Valley Railway, first published in 1863. Both handbooks are obtainable from the Salop County Library, Column House, Shrewbury.

Industrial Archaeology in Gloucestershire The guide to the industrial archaeology of Gloucestershire has been reprinted and is obtainable from Amina Chatwin at 6 & 7 Montpellier Street, Cheltenham. It describes the monuments of Gloucestershire by subject and contains a useful series of maps which pin-point the sites accurately.

Peopling Past Landscapes, John M Steane and Brian F Dix, Council for British Archaeology, 112 Kennington Road, London SE11 6RE, 1979, £3. A hand book for teachers and others involved in the explanation and discover of archaeology for schoolchildren and other young people. Contains a host of practical information which will bring archaeology of any type alive to the younger age group.

Historic Wrecks, The Role of the Department of Trade, Marine Library, Sunley House, 90 High Holborn, London WC1V 6LP. This booklet describes the role of the Department of Trade in

the protection of wrecks and gives useful summaries of the work of the Advisory Committee on Historic Wreck Sites, lists of wreck sites together with maps. There is also a brief list of artefacts recovered from such sites and a selected bibliography.

National Register of Craft Skills in the Building Industry, Civic Trust, 17 Carlton House Terrace London SW1Y 5AW. A feasibility study for the setting up a National Register of Craft Skills, indicating the likely costs of such a service and the advantages obtained by running it.

A Brief History of Platen Presses, D Nuttal, North Western Museum of Science and Industry, 97 Grosvenor Street, Manchester M1 7HF, 20p. This 10 page booklet printed on a 1900 Wharfedale press contains a nice series of illustrations of different printing machines and a useful summary of terms.

Familièrement Inconnues . . . Architectures, Paris 1848-1914 A catalogue to the exhibition 'Architectures, Paris 1848-1914' **Paul Chemetov and Bernard Marrey. Secretariat D'Etat à la Culture, Paris 1976. 168 pp.** An eye-opener for those visitors to Paris who have missed the wealth of splendid cast-iron architecture spread liberally across the capital. More than 200 buildings are listed and illustrated and a separate map identifies the location of each. France, the first European nation to reject the power of monarchy and the Church has paradoxically clung to an appreciation of architecture which, at a popular level is firmly based on regal and ecclesiastical buildings.

The theme of the exhibition was the combined effect on French building of the political revolution of 1789 which redirected capital towards industrial uses, and the revolution in ironmaking which provided a new medium for architectural expression.

Dragonfly, The Journal of the Wilts and Berks Canal Amenity Group, A recent development in canal preservation schemes is the growth of amenity project groups whose aim is to preserve the line and features of a waterway without hoping to open the navigation for boats. Details of this important amenity group can be obtained from the Secretary, Neil Rumbol 14 Chestnut Avenue, Buckhurst Hill, Essex IG9 6EW. A comprehensive programme of events and working weekends is organised in and around Swindon for which further volunteers are always required.

Llechi/Slate M J T Lewis, Gwynedd County Archives Office, Caernarvon, £1.50.

Having established himself as one of the most distinguished archaeologists of the Welsh slate industry, Michael Lewis now turns his attention from the sites to the very large collections of historic photographs in the Caernarvon and Dolgellau Record Offices. Historic views both above and below ground, although the quality of the original is sometimes lost in reproduction. Extended and informative captions, all bilingual 60 pp. 91 illustrations.

Collection, Use and Care of Historical Photographs Robert A Weinstein and Larry Booth American Association for State and Local History, 1400 Eighth Avenue South, Nashville, Tennessee 37203, 1977, \$16. An excellent publication full of practical advice for those involved in the care of historic photographs.

A Star for Seamen, The Stevenson Family of Engineers. Craig Mair, John Murray 1978, £7.50. The great Stevenson family produced many lighthouse engineers over five generations, and they have guarded their family papers closely. Mr Mair has been able to prise open the covers a little and give us an idea of the astonishingly rich archive deposited in the National Library of Scotland.

The Mines of Montgomery and Radnorshire J R Foster Smith, The Northern Mine Research Society, 186 Station Road, Billingham, Cleveland, 1978, £1.50. This booklet, No.10 in the series 'British Mining', provides a description of each mine in the area together with grid reference and some plans. The inclusion of an index of mines and bibliography is most useful.

Dunham Bridge; A memorial history M J T Lewis, Society for Lincolnshire History and Archaeology 25 Westgate, Sleaford, 1978, £1.40. During March 1978 the final iron work of the Old Dunham Bridge was demolished. This marked the end of a long campaign for the preservation of this important cast iron structure in which the AIA took part. It is, however, gratifying that AIA member Michael Lewis has written a most comprehensive history of the bridge and its traffic which has been sponsored by the Department of the Environment and the Dunham Bridge Company.

Drainage Windmills of the Norfolk Marches Arthur C Smith, Stevenage Museum Publications, St Georges Way, Stevenage, Herts SG11 XX £1.40 plus 20p p & p. A further useful guide from the prolific pen of Arthur Smith, covering the surviving remains of drainage windmills in the Norfolk marshes. Most windmills are illustrated and the publication is complete with maps and descriptions of each windmill. Bulk supplies of this publication are obtainable from the author at 18 Fox Road, Stevenage, Herts SG11 JD.

Mineral Industry in Early America, Hillary St Clair, United States Department of the Interior, Bureau of Mines, US Government Printing Office, Washington, DC, 20402, \$1.25 plus 70c postage. A brief review of American mining practice from colonial times, through the development of mining in the far west during the various gold rushes to the mining industry in the late nineteenth and twentieth century. A brief but comprehensive history which includes a considerable bibliography.

AIA Bulletin is published by the Association for Industrial Archaeology. The Association was established in September 1973 to promote the study of Industrial Archaeology and encourage improved standards of recording, research, publication and conservation. 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 interest of Industrial Archaeology at a national level, to hold conferences and seminars and to publish the results of research. Further details of the Association and its activities may be obtained from the Membership Secretary Association for Industrial Archaeology, The Wharfage, Ironbridge, Telford, Salop TF8 7AW England (095-245 3522).