Early blast furnace notes

Assembled by Charles Blick and the Early Blast-furnace Committee

1 Introduction

The last News appeared in *JHMS* 19/1, 1985. In the intervening five years much new work has been undertaken, and an update has been compiled. Authors' names have been given where applicable. Peter King and Peter Hutchison are identified by their initials.

In 1987 Philip Riden produced *A Gazetteer of Charcoal-fired Blast Furnaces in Great Britain in use since 1660* (ISBN 0950329967: from Dept of Extra-mural Studies, University College, Cardiff). This includes 170 sites, some not previously recorded, with bibliographical references, indication of surviving remains if any, and NGR. The Society's index of blast furnaces contains, at present, 90 sites on which there are visible remains of both charcoal and coke-fired furnaces. 40 if these sites are common to both the Riden and Society lists.

2 Additions and revisions to the list of blast-furnace sites

ABERCRAVE (Hen Noyadd) blast furnace, Abercraf, Powys (Brecon).
(1824 to 1829 and 1855 to 1861) NGR SN/810126

The furnace was built to use anthracite in 1824. It was powered by a 35 ft by 8 ft waterwheel using water from the Swansea Canal top feeder. The existing remains are the furnace base, concealed by undergrowth, and a layer of solidified slag extending to perhaps half the height of the bosh. The wheelpit has been excavated but is now filled with brambles. The charging wall still stands and suggests that the furnace was around 30 ft tall. The hearth diameter is about 4 ft. (P.H.)

ALDERWASLEY (AMBERGATE) blast furnace, Alderwasley, Derbyshire
(1764 to 1770) SK/341523

In 1962, W. H. Bailey, Edgar Brook and R. F. Tylecote located the remains of a blast furnace near the northern end of Johnson and Nephew's works. Half of the stack was standing to full height together with three-quarters of the lining.

A very poor print, given to Charles Blick by Edgar Brook, shows Bill Bailey holding a 3 ft staff in front of the overgrown remains. The photograph is now in Derby Industrial Museum. The stack appeared to be nearly 20 ft high. The stack angle above the boshes was 82 degrees and below was 70 degrees. It was said to measure 9 ft across the top of the boshes and 4 ft at the throat. After demolition a concrete floor was laid but nothing has been erected on it since 1964.

The only reference to this furnace appeared in a county directory of 1895 which stated that a blast furnace had been built in 1764 using charcoal, and ore brought in by packhorses. In 1964 samples of slag were recovered and examined by Professor Harry Marsh of the University of Newcastle upon Tyne. He reported that these showed the use of coal/coke as a reductant, not charcoal. The contents of ash and sulphur were low.

This information conflicts with the theory that Alderwasley was the last charcoal-fuelled furnace and suggests instead that it was among the first coke-fuelled furnaces in Derbyshire. Experience gained here enabled operations to be transferred to Morley Park (see below). [See Riden, above: p.22].

ANGELTON blast furnace, Bridgend, Mid Glamorgan
(Built in 1589) SS/905821

The remaining part of the stack of the Angelton furnace fell in the early 1980s. It is now difficult to find the furnace, which stood in a patch of rough ground by the railway. Construction of the railway in 1824 demolished part of the furnace but three walls remained. There is no reason to think that the remains have been removed, but the area is overgrown. (P.H.)

BACKBARROW blast furnace, Newby Bridge, Cumbria (1711 to 1966) SD/355847

Attempts to preserve this, one of the most important charcoal-fired blast furnaces in Britain, are continuing. In March 1988 a seminar was arranged by Cumbria County Council to discuss "A Heritage Survey for Cumbria". HMS was represented by John Marshall and Michael Davies-Shiel and the significance of this furnace was emphasised. English Heritage has recently commissioned a detailed archaeological survey.

The Society's view is that the major interest of the site is as a microcosm of periods and that the buildings and structures must therefore be left at their present height and not lowered or partly pulled down, in an attempt to indicate earlier appearances.

BERSHAM Ironworks, near Wrexham, Clwyd [Fig 1]
(1750 to 1788) SJ/508493

Excavations by the Archaeological Service of Clwyd

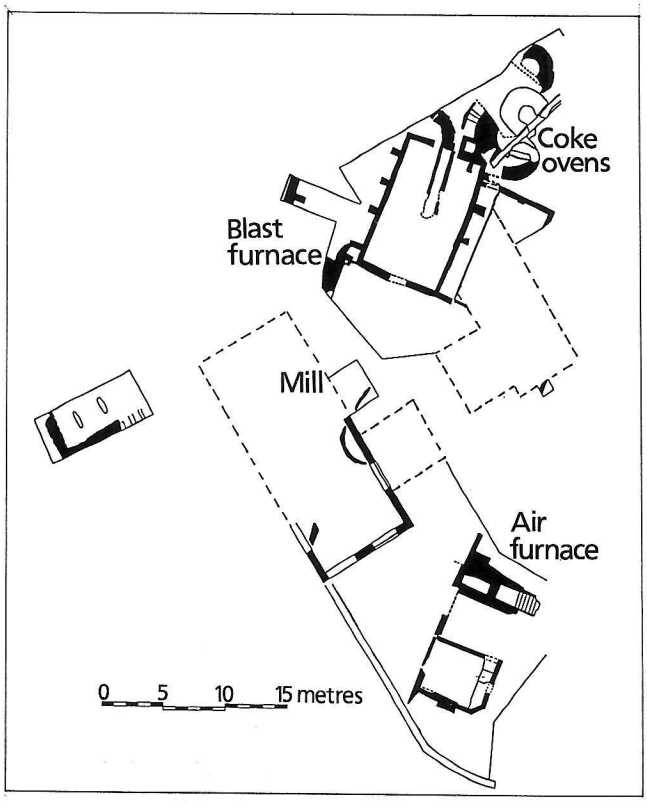

Figure 1. Bersham site plan 1989. (by courtesy of Clwyd County Council).

County Council at this 18th-century ironworks of John Wilkinson concentrated on three areas. The first, where work began in 1987, was previously thought to be a blast furnace. In 1988 excavations revealed a substantial roughly-circular structure 4.5 m high and 5.6 m in diameter with a single opening at its base supported by a cast-iron lintel. Large quantities of lime were excavated from the hearth and surrounds, indicating possible later usage as a lime kiln. It is not certain whether this was its original function since glassy slag adhering to the firebricks in the hearth area suggested iron production. Since the structure of the stack is not that of a blast furnace, it is possibly that of a kiln used to roast ore before smelting.

The other two areas were around a reverberatory or air furnace and the foundry.

Excavations in 1989 disclosed a buttressed building 11 m × 7 m which had been filled in with yellow clay. A watercourse or leat had been built running down the centre-line. This building had been built corner-to-corner to a massive masonry structure, only a fragment of which extended into the excavation site. It is thought that this is a blast furnace, perhaps the one built by Charles Lloyd in 1718, which for the first time in Wales successfully smelted iron ore with coke. (Information from Ann Williams and Stephen Grenter, Clwyd Archaeology Service and from David Cranstone).

BLACKPOOL blast furnace, Canaston Bridge, Dyfed
(17th century) SN/065145

Peter Claughton has located a furnace site, marked by a leat, stack base, and grey-green slag. See Riden (above) p.1; also Hulme E.W. in *Trans Newcomen Soc* 9 (1928–9), 35.

BLAENAVON Ironworks, Blaenavon, Gwent (about
1790 to 1900) SO/248093

The Welsh Office continues with the programme of restoration. Peter Hutchison reports that No 4 furnace has had the casting arch repaired, and the centering for the arch of No 5 furnace is ready. Much debris has been cleared from the site but the finds are no longer on show. The carriage for the water-balance has been removed from the pit, but the water-balance tower is still in scaffolding. Good progress has been made in the restoration of the houses and the Truck Shop, which is to be the new interpretative centre.

Richard Doncaster has visited Blaenavon and noted a boundary wall composed of Bessemer clay tuyeres and some runner bricks reminiscent of uphill teeming of steel ingots. It should be noted that Sidney Gilchrist Thomas succeeded in developing the basic variation of the Bessemer process, which was to bear his name, on this site. The acid (silica) lining was replaced by basic material (burnt lime and tar).

BRYMBO "Old No 1" blast furnace, Wrexham, Clwyd
(1796, rebuilt 1818, to 1894 SJ/287543

This well-preserved stack is thought to be a rebuild of the furnace constructed by John Wilkinson when he founded the Brymbo ironworks. It stood adjacent to the No 4 furnace, which was blown out in 1982 and demolished in 1983. In May 1990 United Engineering Steels announced the closure of the works. It is unlikely that the site will be used for steelmaking again.

The status of "Old No 1" is being investigated.

BUTTERLEY Engineering works, Ripley, Derbyshire
(Built 1791, rebuilt 1838) SK/402516

In 1989 the Butterley Engineering Company cleared an engineering shop from the old ironmaking site. The building stood against the former charging bank, and its demolition revealed the almost complete remains of a blast furnace. Philip Riden reports that the remains are of a stone-built furnace with its back wall forming part of the charging bank, and the tuyere arches are concealed within the bank. The tapping arch was intact, but was partially blocked by an electricity substation. There were two date-stones, one inscribed "B.O. 1791" and the other "REBUILT 1838". The initials are of the founder of the company, Benjamin Outram. There were other features in the furnace bank which could be the remains of the other two furnaces.

CAMBRIAN Ironworks, Maesteg, Mid Glamorgan
(1826 to about 1880) SS/848916

The engine house has been restored as part of a sports complex. It housed two large Neath Abbey engines, probably with 112-inch blowing cylinders. An

Figure 2. Bedford's Ironworks at Cefn Cribwr from the entrance. The furnace is on the left and the gable end of the cast house on the right. (Photo P. Hutchison).

interpretation-board has been provided in the engine house by Ogwr Groundwork Trust and the Llynfi Valley Civic Society. The restoration gives a good impression of the size of these engines. It is possible that the remaining furnace base will be consolidated. (P.H.)

CEFN CRIBWR ironworks, Cefn Cribwr, Mid Glamorgan [Fig. 2] (1773 to about 1834) SS/852835

The site of Bedford's ironworks has been partly cleared by the local amenity society, to allow engineers from Ogwr Borough Council to survey the site. They hope to undertake conservation of the structures. Newspaper reports that the site is threatened by open cast coal mining are unfounded. (P.H.)

CLYDACH Ironworks, Clydach South, Gwent [Fig 3] (1793/1797/1826/1833 to 1879) SO/232128

The Clydach ironworks, in the Clydach Gorge, have been excavated by an MSC team led by Ann Wilson. Her report, *Excavation of Clydach Ironworks (Clydach Gorge), Clydach South, Gwent, Sept 1986–March 1988* was issued in 1988 by the Borough of Blaenau Gwent.

There was charcoal ironmaking in the Clydach valley from the 17th Century at Llanelly. In 1793 a coke-fired furnace plant was built. Two furnaces, of 1793 and 1797, were water-wheel blown. The Clydach Iron Company came into being in 1804 and two further furnaces were built in 1826 and 1833. These were 44 ft high and 14 ft in diameter at the boshes. They were steam-engine blown, No. 2 by a Boulton and Watt engine. No. 1 furnace remained water powered. The plant closed down in 1879.

There followed abandonment, regeneration of vegetation, structural decay and collapse until excavation and restoration began in 1986. Conservation work is still taking place. Now exposed are the hearth areas of three furnaces, the charging house, casting area, and remains of an air furnace, a cupola and some of the blowing arrangements.

P. G. Rattenbury, Stan Coates, Peter Hutchison, Ian Standing and Roger Ward assisted with technical information. Blaenau Gwent Borough Council and CADW (Welsh Historic Monuments) funded the project. The site was made available by the landowner, Mrs. G. D. Chivers of Brynmawr, and the labour was supplied by the Manpower Services Commission (Community Programme).

COALBROOKDALE. The Old Furnace, Ironbridge, Shropshire (1638 to about 1818) SJ/667048

Following the last report (*JHMS* 19/1 p.134), Keith Gale and Barrie Trinder commented on the "aperture" in the lining at the top of the bosh over the tymp. Keith Gale refutes the suggestion that it is a tuyere setting, not only because of its height above the hearth but because there would be no way of changing the tuyere when worn. He thinks the aperture connects with annular passages in the masonry of the furnace essential for drying out, and is an accidental break-through (*JHMS* 19/2 p.206). Barrie Trinder does not

Figure 3. Clydach Ironworks. Nos 1 and 2 furnaces from the public path. No 4 furnace is just out of the picture on the left. (Photo P. Hutchison).

accept that this aperture is the only one, as he considers that the present bottom is considerably above the original working bottom (*JHMS* 19/2 p.206). This conflicts with Arthur Raistrick's original statement (letter *JHMS* 19/1 p.134) that he and Fred Williams had made a deep excavation in the crucible — and "there was no hole of any kind which could have been a tuyere". They had reached the bottom of the hearth and found only the great mass of bear. Dr. Raistrick has confirmed his statement.

COMPTON FURNACE, Kinver, Staffs (1606 to about 1639) SO/815834

The existence of this furnace has not been noted before. The sources are documentary rather than archaeological. Like Moddershall this stood on the edge of an area of woodland, in this case Compton Park, where there were a few deer until 1651. The park contained a chain of pools which no doubt provided the bellows wheel of the furnace with power. Compton Mill was let in 1606 by Gerrard Whorwood, who owned the park, to Thomas Green and Geoffrey Mason of Wombourne (Foley E12/F/VI/KD/box 1099, deed of 1606). The lease was for a mere three years, presumably being as long as the wood would last.

Thomas Green's name is perhaps preserved in Greensforge, a forge which operated until the 1680s (Victoria County History, Staffordshire, 20, 213 and sources cited there); at the time it was probably held by Lord Dudley and his brother; Green and Mason were therefore probably their managers.

In 1639 Richard Foley was tenant of Compton Mill. In 1643 he gave some neighbouring land to his youngest son John, who was not involved in the iron industry; this suggests that Richard Foley had used the furnace at some time but was then abandoning it (Foley E12/S, box 737, mortgage of 1639 and Foley E12/S, manor rolls of Compton Hallows, 1643 and 1653).

Documents in the Foley Collection at Hereford Record Office are quoted by kind permission of Mr. A. T Foley at Stoke Edith, near Hereford. (P.K.)

CYFARTHFA ironworks, Merthyr Tydfil, Mid Glamorgan (1765 to 1872) SO/038070

The 1765 furnaces at Cyfarthfa are used as a retaining wall. The blowing passage is still in good condition.

One blowing chamber is in poor condition, the rest

look unsafe. There is some interest from various bodies in conserving these historic furnaces, but finance is lacking. (P.H.)

DARK HILL blast furnace, Forest of Dean, Gloucestershire (about 1818 to 1847) SO/590087

The Forestry Commission has now backfilled the site and intends to provide interpretation for the public.

DOL-Y-CLOCHYDD blast furnace. Llanfachreth, Merioneth [Fig 4] (1597 to about 1604) SH/734219

and

DOLGUN blast furnace, near Dolgellau, Merioneth [Fig 5] (1719 to 1802) SH/751187

Peter Crew, Merfyn Williams and students from the Snowdonia National Park Study Centre have completed excavation and post-excavation work and consolidation at both these sites, which were visited during the 1987 Annual Conference.

Sketch plans and tentative reconstructions have been drawn by Ian Walters.

DYFI (DOVEY) blast furnace, Eglwys Fach, Dyfi, Dyfed (about 1755 to 1810) SN/685951

Excavation, interpretation and conservation have been completed by CADW (Welsh Historic Monuments), and the report by James Dinn has been published in *Post Medieval Archaeology* 22 (1988) 111–142. The site of 17th-century silver mills was identified under the stack area. The hearth and casting area are on display with documentary evidence. Interpretation of the operation of the furnace has been established, and the furnace site is open to the public.

GUNNS MILL blast furnace, Forest of Dean, Gloucestershire (1628/9, rebuilt 1683, to 1732) SO/675159

The owner has applied for scheduled monument consent to convert the paper mill loft above the furnace into a residence. English Heritage has commissioned a standing-structure report. The furnace was visited during the Forest of Dean Conference in 1988.

GWSCWM ironworks, Burry Port, Dyfed (1824 to about 1880) SN/437013

The ironworks were built in 1810 by Farquharson and Simon, and enlarged to include a blast furnace in 1824 by Gaunt and Co who owned the Gwscwm colliery. Thomas Gaunt also owned an iron-ore mine in Trimsaran. The A484 road runs along the charging platform. The furnace stack stands in a private garden amongst some uneven ground that could conceal other remains. (P.H.)

HALTON blast furnace, Halton, Lancashire (1752 to about 1790) SD/498650

Schubert, *History* . . . p.376, mentions a charcoal blast-

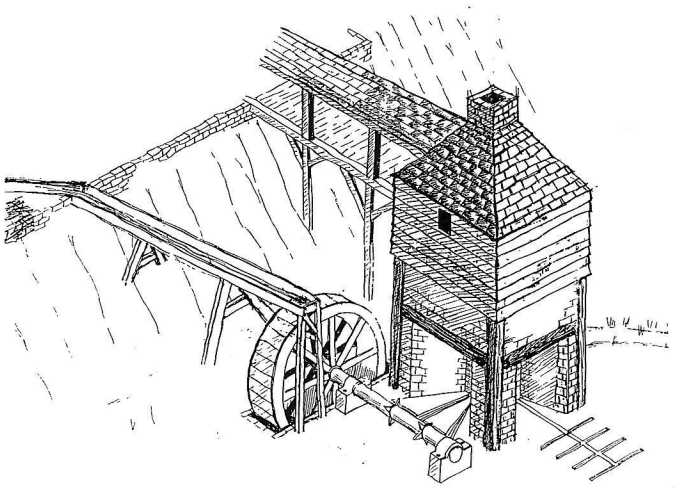

Figure 4. Doly-y-Clochydd blast furnace. Tentative reconstruction by Ian Walters for the Snowdonia National Park Study Centre.

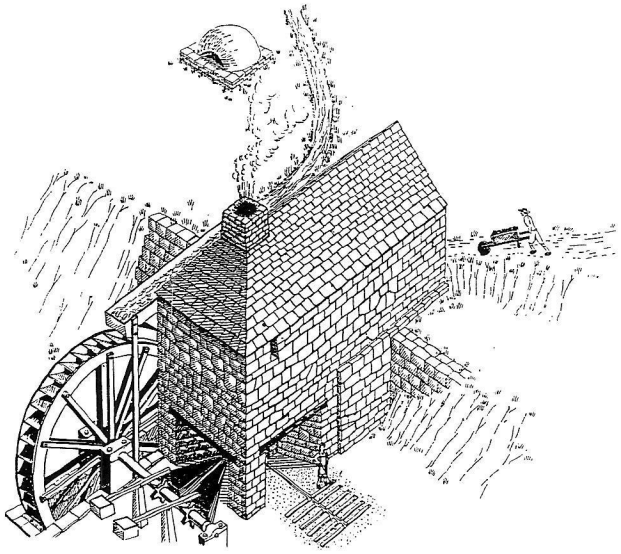

Figure 5. Dolgun blast furnace. Tentative reconstruction by Ian Walters for the Snowdonia National Park Study Centre.

furnace, erected in 1756 and still operating in 1790. It was said to be very successful, and the company operating it bought out the Leighton furnace, which it ran for a further 40 years. The furnace stack was demolished and the site became a foundry which operated into the second half of the 19th century. Yates' map of 1786 records the furnace site.

The site and the remains of the stack were thought to have been destroyed by the M6 motorway, but in 1988 Michael Davies-Shiel located a head-race ending in a small pond. The 1860 OS six-inch map showed this mill dam and a set of buildings which still remained. One was the charcoal barn, another the iron ore store.

By comparison of the layout of features at the charcoal

blast furnace sites of southern Cumbria and north Lancashire, Backbarrow, Cunsey, Duddon, Leighton, Newland, Nibthwaite, Penny Bridge and Halton, it was possible to estimate the position of the Halton stack. Charcoal, pottery, slag and some small coal were visible. The furnace site is only partially covered by the approach road to the motorway. The present owner of the site has been very helpful.

HIRWAUN ironworks, Hirwaun, Mid Glamorgan (1820 to 1859) SN/957057

The four furnaces at Hirwaun still stand, in waste ground near the centre of the town. (P.H.)

LEIGHTON BECK blast furnace, Slackhead, Cumbria [Fig 6] (1713 to 1806) SD/484779

In *JHMS* 19/1, p.185 the condition of this site was recorded, with emphasis on the well-preserved charcoal barn. Early in 1988 Michael Davies-Shiel reported that the barn had been converted to domestic use and that access to the site might be prejudiced. No application for conversion of this listed building had been noticed. English Heritage was informed.

The Leighton furnace was in competition with that at Halton, on the river Lune, 2 miles NE of Lancaster. The owners of Halton furnace took over Leighton furnace, renewing its lease in 1755. Its career came to a spectacular end in 1806, when it blew up.

LYDNEY blast furnace, Forest of Dean, Gloucestershire (1604 to 1810) SO/629028

Residential development threatens the site of this furnace, and it is hoped that excavation can be arranged before this takes place. Meanwhile some exploratory work has been undertaken by pupils from the adjoining school. A piece of pig iron from the site was analysed and a phosphorus content of 0.46% was obtained. This is remarkable since most Dean iron ore is haematite. Percy, Vol II/I pp.206/207 and 224/225 quotes Dean haematite ores at around 0.1% P, which would have given an iron analysis of about 0.2% P.

MELIN-Y-CWRT Ironworks, Neath, West Glamorgan (1708 to 1808) SN/824018

The furnace is marked by a heap of rubble with some lining exposed at the top. Most of the ivy on the one remaining wall of the range of buildings has been killed. A plan of the works in 1780 is in the Glamorgan Archives. Some sections of the leat can be found.

MODDERSHALL FURNACE (17th century) c.SJ/9236

This furnace is only known from documentary sources: the site has not been located. It probably lay on the brook flowing through the former heath of Moddershall, also known as Withnall Forest or Chase. This comprised 1100 acres and if coppiced it would have provided charcoal.

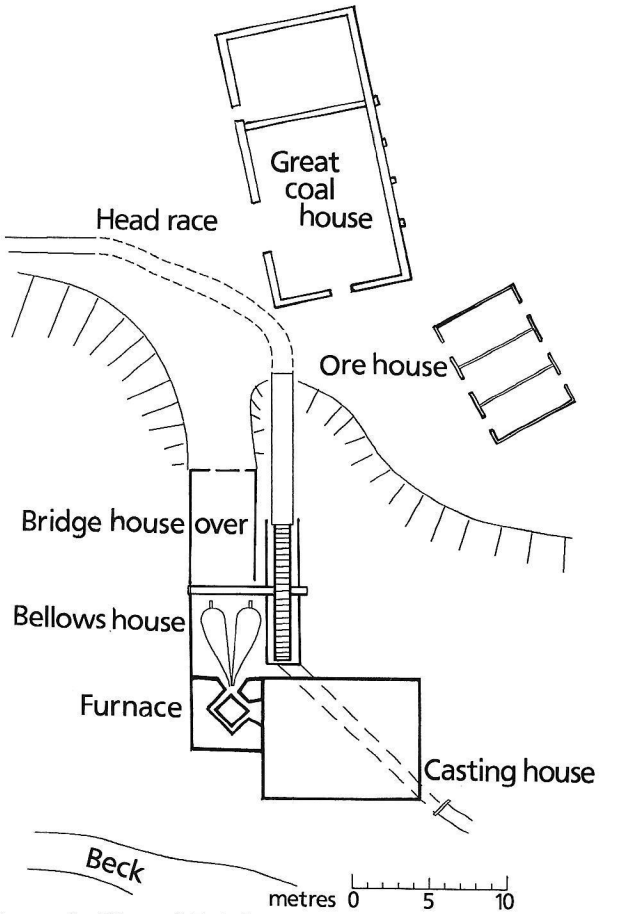

Figure 6. Plan of Leighton Beck blast furnace (after M. Davies-Shiel from a survey by A. Hyelmann and M. Davies-Shiel). Scale approximate.

It is suggested that this was the furnace at Mathrafal referred to in *JHMS* 18/2 132, on the basis of a note on an account for the Staffordshire Works referring to a furnace whose name might be read as Madarfall or Madarsall (Foley E12/F/VI/MAF/3). A reference has since been found to a "Moddershall Furnace". It would have been unusual for a forge as early as 1650 not to have been associated with a furnace, and it may be that there was a furnace at Mathrafal when the forge was first built there in the 1650s. However for the moment there is no documentary evidence for one. (P.K.)

Alternatively, as the area is about two miles northwest of Stone, it may be the Stone Furnace referred to by Schubert (1957, 388); however the early date which he suggests is not supported by the sources he cites. Stone Furnace was one of a considerable number sold by Thomas Parkes to Henry Goreing, Middleton, Nye and others in 1618 and operated by the latter for some years. In 1662 Robert Slaney held Moddershall Furnace as tenant of Thomas Foley, which suggests that he or his father Richard Foley had held it at some previous period (Foley E12/F/VI/KAC/45, cf ibid/20). The last mention of the furnace is dated 1683, the reference misinterpreted as referring to Mathrafal (Foley E12/F/VI/MAF/3). (P.K.)

MOIRA blast furnace, Leicestershire (1804/1840) SK/314153

After the completion of restoration of the furnace, the surroundings were officially opened on 17th May 1985. The furnace is now the centre-piece of a guided route around the site and a nature trail in an adjoining plantation. Descriptive booklets, postcards and copies of the excavation report can be purchased in the café in the charge-house.

The furnace is built along similar lines to the first STAVELEY blast furnace, Derbyshire, with a charge-house built over a series of arches which abut the furnace stack. Materials for the charge were stored in the roofed bridge-house loft. The furnace lining was found during excavation to be complete, with firebrick in the stack and bosh. The internal dimensions are those of a shallow-bosh furnace, maximum diameter 3.4 m in the stack, bosh diameter 3.3 m and the top of the crucible — as blown — 2.2 m dia. the height from the surface of the hearth to the charging hole was between 11.0 and 11.5 m. The bosh angle was about 50 degrees. The internal base of the hearth including forehearth was about 2.2 m long and the width increased from 0.7 m in the forepart to 1.2 m between the tuyeres. It was subcircular rather than rectangular in form.

The furnace internal lines were not symmetrical with the rear wall of the bosh; they were distinctly steeper than the front. The forepart bosh was unusually wide and shallow. [*From my own observations inside the stack as it was emptied, I had the impression that the furnace "worked" up the back wall causing this eccentricity. This was inefficient practice. I do not believe the furnace was built eccentrically. CRB]*

The crucible is preserved in situ, as blown, with a diameter of 2.2 m. There were two tuyeres, angled slightly to the back of the furnace. The forepart was found to be in a remarkably good state of preservation; the tymp survives, though not the tymp plate, as does the rear of the dam with some possible indication of a tapping hole (some doubt exists as to the correct interpretation on this point). The furnace was blown by a Boulton and Watt type of double acting beam engine which has long since been removed. (Contributed by Duncan McCallum)

A comprehensive excavation report: *Moira Blast Furnace — A Napoleonic Blast furnace in Leicestershire* (148 pp) — edited by David Cranstone, with contributions by M. Palmer, M. Adams, D. Higgins, P. Craxford and C. J. Salter was published by North West Leicestershire District Council, Coalville in 1985 (ISBN 095011906).

MORLEY PARK blast furnaces, Heage, Derbyshire [Fig 7] (1780 and 1825 to 1874/75) SK/380482

This furnace is now in the ownership of the Derbyshire Archaeological Society. A scheme to

Figure 7. Morley Park blast furnaces in about 1880. Photo by courtesy of K. Reedman.

arrest decay started in 1985 with the masonry of the 1818 furnace repointed in the first year. Work continued in 1986 with MSC-funded labour. Collapsed lining material was removed and concrete lintels were inserted to support the remainder. The other furnace was emptied of its last working burden. (Duncan MacCullum)

In 1989 Philip Riden's article "The Ironworks at Alderwasley and Morley Park" was published in *Derbyshire Archaeological Journal*, CVIII (1988). This showed from documentary evidence that the first furnace at Morley Park was built in 1780. This furnace was rebuilt in 1818 — as shown on the date-stone of what had been previously taken to be the second furnace. The second furnace on the south of the site whose datestone is unreadable and was originally believed to have been built in 1780, was not built until 1825.

Both furnaces were blown by the steam engine at the north end of the site. The layout is shown in a photograph of approximately 1880, after the closure of the works (courtesy of Keith Reedman). The Burt family, who owned and originally worked the Morley Park furnaces, had previously built what has been thought to have been one of the last charcoal-fuelled furnaces in the country in 1764, at Alderwasley (Ambergate) in the Derwent Valley, a few miles to the north west [see entry above]. The Morley Park furnace was coal/coke fuelled, and steam engine blown, from the start, and it is possible that experiments with the use of coal/coke at Alderswasley led to the construction of Morley Park furnace near to sources of coal.

NEATH ABBEY ironworks, Neath, West Glamorgan (1793 to 1886) SS/738977

The story of the Neath Abbey Ironworks has been written up by Laurence Ince in *Industrial Archaeology* (Spring 1977, pp. 21–37) while an article by the same author on the beam blowing engines of the Company appeared in *JHMS* 17/1 1983 pp.20–22.

The two furnace stacks, which are scheduled monuments, are (Sept 1989) enclosed in scaffolding. Neath Borough Council is currently studying a £100,000 scheme to save the structures. Repairs to the furnace arches and associated support work and pointing of all furnace walls are urgently required. No. 1 furnace was 52 ft high while No. 2 was approximately 65 ft high. The hearth is lost from No. 1 but there are the remains of forehearth, slag notch and tuyeres in No. 2.

A fire in the 19th-century workshops has made them unsafe and they may have to be demolished. The rolling mill building is in commercial use. The remaining houses are occupied.

The site is owned by Neath Borough Council and is currently locked up. Access (with the Council's permission) is across land controlled by a joinery company and is usually only possible during normal working hours.

NEWENT blast furnace and charcoal barn, Oxenhall, Forest of Dean, Gloucestershire (1647 to 1751) SO/720264

The buildings are Listed Grade II (*JHMS* 19/1 1985 p.135). The roof of the charcoal barn, which had been removed, was replaced by a free-standing corrugated roof, set clear of the building.

NEWLAND blast furnace, near Ulverston, Lancashire (1747 to 1891) SD/299798

The furnace was visited during the 1985 Annual Conference when the internal lining was in a dangerous condition, preventing entry to the furnace interior. In April 1989, John Marshall and the I.A. Committee of the Cumbria and Westmorland Antiquarian and Archaeological Society produced a report on the need for scheduling the site and the locality, entitled "Newland Furnace and Hamlet" to draw the attention of the local authorities and English Heritage to the need for action. Scheduling has not yet taken place.

Dr. Marshall's report, which includes reconstruction drawings by Michael Davies-Shiel, points out that industrial villages were created by the cotton textile industry in the 18th and 19th centuries. Complete industrial settlements centered on the charcoal iron industry of the 18th century were exceptional. NEWLAND is such a hamlet, having developed from 1747. Along 400 yards of the valley bottom it comprises the original corn mill, the early farm site and outbuildings, a master's house, a furnace-keeper's cottage, three other dwellings, an iron-ore store, a charcoal barn complex, a furnace complex with the original casting and moulding shop visible, and the site of a blacking-mill. All the dwelling houses are occupied and the ore store has been converted into a private house.

Due to the need for charcoal for smelting, the first owners of Newland developed an iron smelting colony at LORN (BONAWE), Argyllshire from 1752. The LORN (BONAWE) furnace was restored in 1975 together with some remains of the industrial village.

PENTYRCH Ironworks, Taffs Well, Mid Glamorgan. (1740 to about 1880) ST/126828

In July 1989 Philip Riden reported that while excavating foundations for sheltered housing near Heol Berry, Taffs Well, contractors had struck substantial masonry. He identified the main structures as part of the blast-furnace plant of the Pentyrch ironworks which had closed in the 1880s, but there was a possibility that part of a 16th-century furnace had been exposed. Glamorgan Gwent Archaeological Trust recorded features before the site was backfilled and consolidated for building.

There was a confused mass of masonry and brickwork, shafts, tunnels, and flues from the demolition of the 19th-century furnaces, and from

dumping over a long time. Peter Hutchison's interim conclusion, pending full archaeological reports, was that while heat-affected sandstone surfaces might possibly be from an early furnace, they are more likely to be from a flue of some kind.

Philip Riden reports evidence of a furnace around 1570 at Pentyrch, apparently casting guns until about 1600. This infringed the monopoly of Ralph Hogge for the export of cast-iron guns. The Exchequer Commissioners were involved in 1609. There is no firm evidence that this furnace remained in use after 1616. Iron making appears to have restarted about 1740 with one furnace. Improvements were carried out in 1810 and a second blast furnace was built between 1830 and 1839. A third furnace was added in 1875–6. In common with so many South Wales ironworks, the Pentyrch plant closed in the 1880s, and the furnaces were abandoned.

SKERRY EAST blast furnace, near Newtowncrommelin on the banks of the Skerry Water, Co. Antrim, Northern Ireland (1844 to 1846) NGR D 144173

A picture of this furnace was noticed by Dr. J. K. Almond in W. A. McCutcheon's *The Industrial Archaeology of Northern Ireland* (HMSO, 1980) in 1983, and Dr. B. G. Scott confirmed its existence. Through the Mid-Antrim Historical Group and the Ballymena District Council, contact was made with Kevin J. O'Hagan, whose assistance with this note is acknowledged. He had been born about 200 yards from the furnace and had studied the history and underground workings of the Co. Antrim iron ore mines for the last 15 years. He reported that the furnace, better known as Crommelin's furnace, was built in 1844 by Nicholas, a descendant of the Huguenot family of Crommelin who came to Northern Ireland in 1698. Iron ore has been found on the site which contains 18% to 25% peroxide of iron (Professor J. F. Hodges). Crommelin built the furnace to use local peat for firing. He made repeated efforts to smelt the ore and succeeded only to a small extent, for "the difficulties were so great that he abandoned the idea altogether" (Kevin J. O'Hagan).

The stone stack stands intact, with a tapping arch, two blowing arches and intact charging hole. The lining is fire-affected. The means of blowing are not clear: no evidence of water power has been found, and steam blowing is unlikely due to the lack of local coal.

Plans to build a house adjacent, and to preserve the furnace, have not yet been carried out.

STEPASIDE Ironworks, Kilgetty, Dyfed (Pembrokeshire) (1849 to 1877) SN/142073

Dyfed County Council have made good progress on the scheme proposed in their report issued in 1983. The Grove colliery area has been cleared and some of the buildings have been stabilised. The drum-house foundations for the incline have been cleared, as has the incline. Most of the pebble sleepers have been removed to the picnic area to improve the surface of the tramway, which is the only access to the upper part of the site. Down the incline on the charging platform the kilns have been cleared. The furnaces were demolished some years ago, but the cast house survives as a windbreak for the swimming pool. (The main area of the ironworks is occupied by a caravan site). The engine house is in fair condition. The workshops, known as The Platform are roofless shells but they may be restored as a museum and craft centre. A visitor-reception centre on the approach from Stepaside is manned by the local historical society (P.H.).

SUMMERLEE Ironworks, Coatbridge, Glasgow (1836 to 1931/2) NS/729655

The site of this works, which only produced pig iron, is in the middle of Coatbridge and at one time had eight blast furnaces. The Summerlee Heritage Trust is developing an industrial museum, the first part of which was opened in 1987. Excavations have revealed the remains of bases of furnaces, stoves and blowing engines.

TRELLECH blast furnace, Trellech, Gwent (Mid-17th Century) SO/491048

There is considerable tree growth within the substantial remains of this scheduled blast furnace stack, which stands in Woolpitch Wood. Felling and lopping has been advised.

VENALLT blast furnace, Cwmgwrach, Neath Valley (1842 to about 1860) SN/864050

It was reported in *JHMS* 19/1 1985 that conservation of the remains had been completed. A handbook entitled *Venallt Ironworks, Cwmgwrach — Anthracite iron in the Vale of Neath* (ISBN 0907599079) has been produced by the County Planning Department of the West Glamorgan County Council. It also covers the iron sites along the vale of the river Neath and industrial archaeology in West Glamorgan.

WHITECLIFF blast furnace, Coleford, Forest of Dean, Gloucestershire SO/568102

Ian Standing reports the conclusion of the second year of excavations by the Manpower Services Commission. The chargehouse repairs were completed in November 1987. All the work has been paid for, all the grants claimed and £20,000 has been raised and spent on the stack. To the south of the furnace, an MSC-funded excavation revealed the base of a second blast furnace, several other structures and valuable information from stratigraphy.

YNYSFACH ironworks, Merthyr Tydfil, Mid Glamorgan (1801–1887) SO/045057

The furnaces remain as a retaining-wall, cut off at the front at about half height and angled back to approximately their original height. The stacks are filled but the linings are visible on the sloping bank. The blowing arches, the blowing passage and the tapping arches are walled up. One cast-iron nameplate survives, dated 1836. A tunnel, use unknown, extends along the block just below the charging level, roughly above the blowing passage. The engine-house has been restored and converted into a museum. (P.H.)