

ART. XII – *Iron-working at Cunsey Forge: the archaeological and documentary evidence from an initial survey*

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THE Furness district of Cumbria is well known for its rich deposits of iron ore, which have been exploited since at least medieval times. During this period, iron ore was smelted in a simple, charcoal-fired furnace known as a bloomery. It was here that a spongy mass of wrought iron, or “bloom”, was produced from the direct reduction of iron ore. The bloom was then passed to a forge, which may or may not have been located at the same site, where it was reheated and hammered by hand to drive out any remaining impurities, and fashioned into a range of saleable goods. By the sixteenth century, these processes were undertaken in a bloomsmithy, which may be defined as a combined bloomery and forge with only one hearth, and with both the bellows and hammer being water-powered (Bowden, 2000, 3). However, the activities of the bloomsmithies in the region were curtailed after 1564, when tenants of the Duchy of Lancaster lands in the Furness Fells were prohibited from manufacturing iron, except for domestic use (Awty, 1977, 97).

The “bloomsmithy decree” remained in force until 1616, after which date a relaxation of the royal decree allowed several iron-working sites to be established in the region. The first to capitalise on this situation was the pioneering ironmaster William Wright, who has been described as the leading figure of the seventeenth-century Cumbrian iron industry (Phillips, 1977, 37). Wright had been engaged in iron-working in the Cartmel area since at least 1608, and had obtained the assignment of a five-year lease of Burnbarrow forge in 1614 before establishing the bloomery forge at Cunsey in 1618 (*ibid.*). A bloomery forge, or bloomforge, was a type of site that dominated the Cumbrian iron industry during the seventeenth century. As with a bloomsmithy, the bloomforge produced iron by the direct process, but contained several hearths. It also co-existed with the indirect process of iron manufacture, which was confined to the blast furnace.

Cunsey forge was erected on a plot of land adjacent to Cunsey Beck, which provided the power to drive the forge bellows and hammers. The forge continued as an iron-working site for over 130 years, during which time it was refurbished and modified on several occasions. It ceased production during the mid-eighteenth century, although it seems that the final closure was somewhat protracted.

Much of the forge had been dismantled by the beginning of the nineteenth century (Fell, 1908, 209), although a wood hoop-maker occupied the surviving elements for a short period during the early years of the twentieth century (Bulmer, 1911, 343-4). These remaining structures were used subsequently for agricultural purposes until they were largely demolished during the 1980s (Plate 1), although part of a range of buildings along the western edge of the site survived to a reduced height. In June 2002, however, the Lake District National Park Authority (LDNPA) Archaeology Service was notified that these fragmentary remains had sustained further demolition, and that the floor of the buildings had been substantially

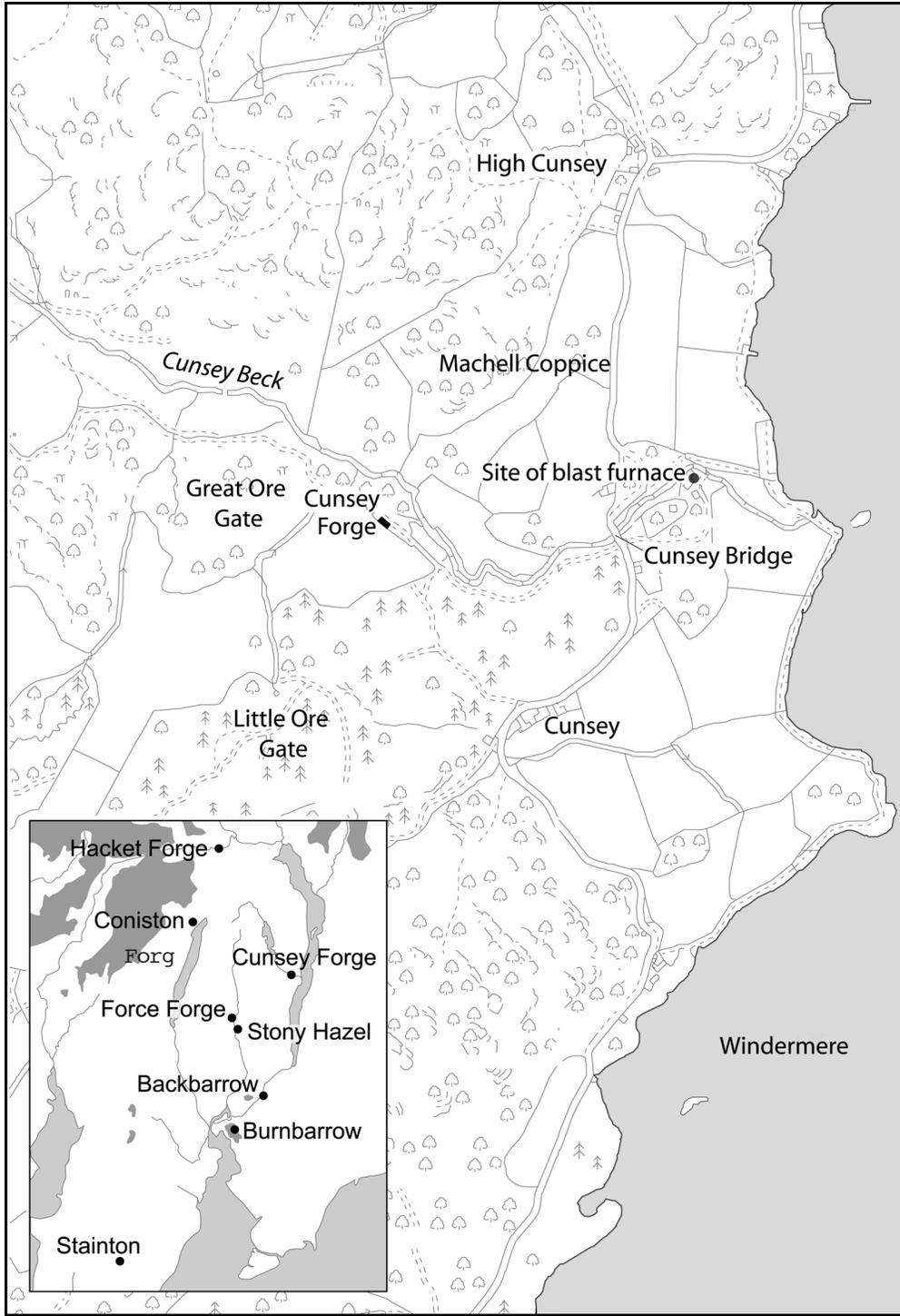


FIG. 1. Location map

disturbed, exposing various features of archaeological significance. Consequently, the LDNPA Archaeology Service proposed a scheme of archaeological investigation as an initial stage of a longer-term conservation and management strategy for the site. The archaeological component was undertaken by Oxford Archaeology North during January 2003. It comprised the clearance of rubble from part of the site, combined with a programme of targeted excavation, and rectified photography of standing walls. An appraisal of the archive sources pertaining to the site was also undertaken to enhance the results of the fieldwork. During the course of the investigation, a geophysical survey of the study area was undertaken by Engineering Archaeological Services Ltd. This was intended primarily to establish the areas of iron-working, and investigate any evidence for the remains of a bloomery on the site.

Site Location

Cunsey forge (centred on SD 37766 49361) lies some 5 km south-east of Hawkshead, within the South Cumbria Low Fells. The landscape of the area is characterised by low fells and ridges, associated with the underlying mudstones, siltstones and sandstones of the Silurian Windermere Group (Countryside Commission, 1998, 66). The forge occupies a plot of land at a height of *c.*60 m OD, and is situated in a woodland area on the south side of Cunsey Beck. This watercourse is the only outflow from Esthwaite Water, to the north, and is the largest feeder into the west side of Windermere, which lies a little over 1 km to the east (Cooper, 1928, 43).

The mixed woodlands to the west and south-west of the forge, known as Great Ore Gate and Little Ore Gate respectively, comprise coniferous plantation, although both also contain dense groups of hardwood species, some of which have been coppiced in antiquity. Similarly, on the north side of Cunsey Beck lies a tract of woodland known as “Machell Coppice” (Figure 1).

Documentary Evidence

Origins

The earliest documented reference to iron production in the area is provided by the Certificate of the Revenues of Furness Abbey, which was issued in 1537. The terms of the Certificate permitted the King’s Commissioners to lease sufficient woods in the Furness fells to William Sandys and John Sawrey to operate three bloomsmithies (Cowper, 1899, 215). The lessees took up the manufacture of iron with the intention of supplying the forged metal to the tenants of the manors of the Abbey (Cowper, 1897, 22). The location of these bloomsmithies is not given, although a document of 1549 refers to “Constey Smythy”, implying that Cunsey provided the site for one of the three. However, the exact position of the bloomsmithy is not specified (Fell, 1908, 181-3).

Some interesting information regarding the area is provided by an agreement between Thomas Sandys of Graythwaite and Christofer Sandys of Killington, dated 2 May 1550, which concerned “one cloyse lying nere the brode watter of

Wenaundermyre called Consay close”, and included woods and a barn “nowe builded” (LRO DDSa 2/1). “Consaye Close” is mentioned subsequently in a survey of 1567, which states that the property comprised 70 acres of underwood and 500 saplings (Fell, 1908, 108-10). Whilst these documents do not provide any firm evidence for iron-working at Cunsey, they do establish that the land comprised an enclosure with an abundance of wood that was owned by the Sandys, a local family of some significance: William Sandys the elder, who died 1547-9, has been described as the first individual ironmaster of Furness (*op. cit.*, 256). Indeed, Sandys is the only family in the region to have been connected with iron-making in Furness since the late medieval period.

The origins of Cunsey bloomforge may be traced to March 1618, when William Wright acquired a lease of land at Cunsey on which to build an ironworks (Phillips 1977, 37). A further lease (LRO DDSa 2/5), amending that of March 1618, was issued on 2 September 1621 by Katherin Sandys of “Grathwaite” to William Wright, who is described as a “hammerman”. The lease was for 18 years at £10 rent, and incorporated “two acres of ground by Consay Beck, with a forge, other buildings, a dam already made in the beck, banks on both sides of the dam, liberty to pound and stay the water, way to Consay mill and Windermeer water [*sic*], liberty to get ‘sodds and stones’ and ‘grubbe up’ woods and trees near the dam, with bloomsmithy and colehouse”. The specification of a “forge” and a “bloomsmithy” individually is curious, and suggests that the complex incorporated two separate components dedicated to the direct smelting of iron ore. This is compounded by the details of a modified lease, issued on 26 August 1622 (LRO DDSa 2/7), which included the “liberty to convert the blomsmithie [*sic*] to a syth milne”. This implies that the bloomsmithy was surplus to requirements, although the proposed conversion does not appear to have been acted upon as the bloomsmithy is mentioned in subsequent documents (Fell, 1908, 192).

The lease of 1622 also included a provision for purchase of the forge gear by Miles Sandys. It seems that some of the details of this lease may have been contentious, as an award of 20 January 1623 refers to Christopher Philipson of Calgarth and three others acting as arbitrators in a dispute between Miles Sandys and William Wright (LRO DDSa 2/6). Philipson had an interest invested in the forge which, upon his death in 1634, was passed to his nephew (Fahy, 1964, 191). However, any problems were clearly resolved as William Wright’s lease to the forge was extended for a period of 21 years on 27 June 1638 (LRO DDSa 2/8).

The finery and chafery

On 2 May 1639, an agreement between Gawen Brathwaite (a cousin of Christopher Philipson, and a lessee of Hacket forge) and William Wright documents the proposed division of the forge (LRO DDSa 2/11). Under the terms, Gawen Brathwaite was to have the “upper finerie” and William Wright to have the “chafferie” and “lower finerie”. These details indicate that the forge was equipped at an early stage with both finery and chafery hearths, which are usually associated with a refining forge; these operated in conjunction with blast furnaces, and were dedicated to the conversion of cast pig iron to wrought iron.

Evidence for other structures on the site during this period is provided by an

indenture, issued between William Wright and his son, Alexander Wright, and Rowland Lawson on 20 June 1647 (CRO(B) BD/HJ/89/8). This refers to “the fforge [*sic*] or Iron Works at Consey commonly called Consey fforge together with one dwelling house one coal house one stable one house for iron and all other houses, buildings, floodgates . . .”.

Ironmasters after William Wright

Upon the expiry of his lease in 1659, William Wright relinquished the Cunsey works (PRO PL 6/22). Information regarding subsequent occupiers is provided by the Hawkshead parish register (1568-1704), which includes entries for Charles Russell “of Consey”, whose name first appears in 1665 (Cowper, 1897, 275). The Russell family had emigrated from Normandy to Sussex in *c.*1520, and have been traced to ironworks in Yorkshire before arriving in Cumbria in *c.*1630, where their importance for the region’s iron trade during the seventeenth century was second only to William Wright (Awty and Phillips, 1980, 33).

Fell (1908, 192) claims that Charles Russell left Cunsey for Coniston forge in 1675, although “Charles Russell de Consay forge” appears several times in the Hawkshead parish register until 1690 (Cowper, 1897). Moreover, a partnership between Myles Sandys, Charles Russell and Richard Washington of Kirkby Kendall, referring to the business of making and selling iron at Cunsey forge, was issued on 19 October 1681 (LRO DDSa 38/1). Each partner agreed to contribute £100 to joint stock at the forge, which doubtless represented a fairly substantial investment.

A document issued in 1688 (CRO(B) BD/HJ/89/2) refers to the “bargain and sale of premises at Cunsey, including forge and iron works”. The outcome of this proposed sale is uncertain, although the date given would seem to coincide broadly with a change in the resident ironmaster at the forge: entries in the Hawkshead parish register for 1696 mention Emanuell Ellattson “de Consey forge”, whilst in 1698 and 1703 Clement Holme of “Consey forge” is entered. John Massocks, who had been employed at Force forge in 1680, also appears in entries of 1701 and 1703 (Cowper, 1897). At some point prior to 1711, however, the lease of the forge was transferred to local ironmasters John Machell and William Rawlinson, although the exact date for this is uncertain.

Blast furnaces and refining forges

A significant development in the iron industry of Furness was the introduction of the blast furnace to the region during the early eighteenth century. These not only vastly increased the output of iron, but were also associated with investment from outside the region and the emergence of iron companies. The Cheshire iron masters Daniel Cotton and Edward Hall founded the first of these, the Cunsey Company, in 1711, and began to erect a blast furnace on a site close to the outflow of Cunsey Beck into Windermere (Fig. 1). Whilst this lay some 900 m to the east of Cunsey forge, the two ironworks were independent concerns at this time. Fell (1908, 207) observed that the arrival of a party of adventurers into the district with the object of building a smelting furnace at Cunsey acted as a catalyst for local ironmasters to follow suit, and resulted in the formation of the Backbarrow Company, also in 1711. This consisted of William Rawlinson of Force Forge, John Machell of Backbarrow, Stuart

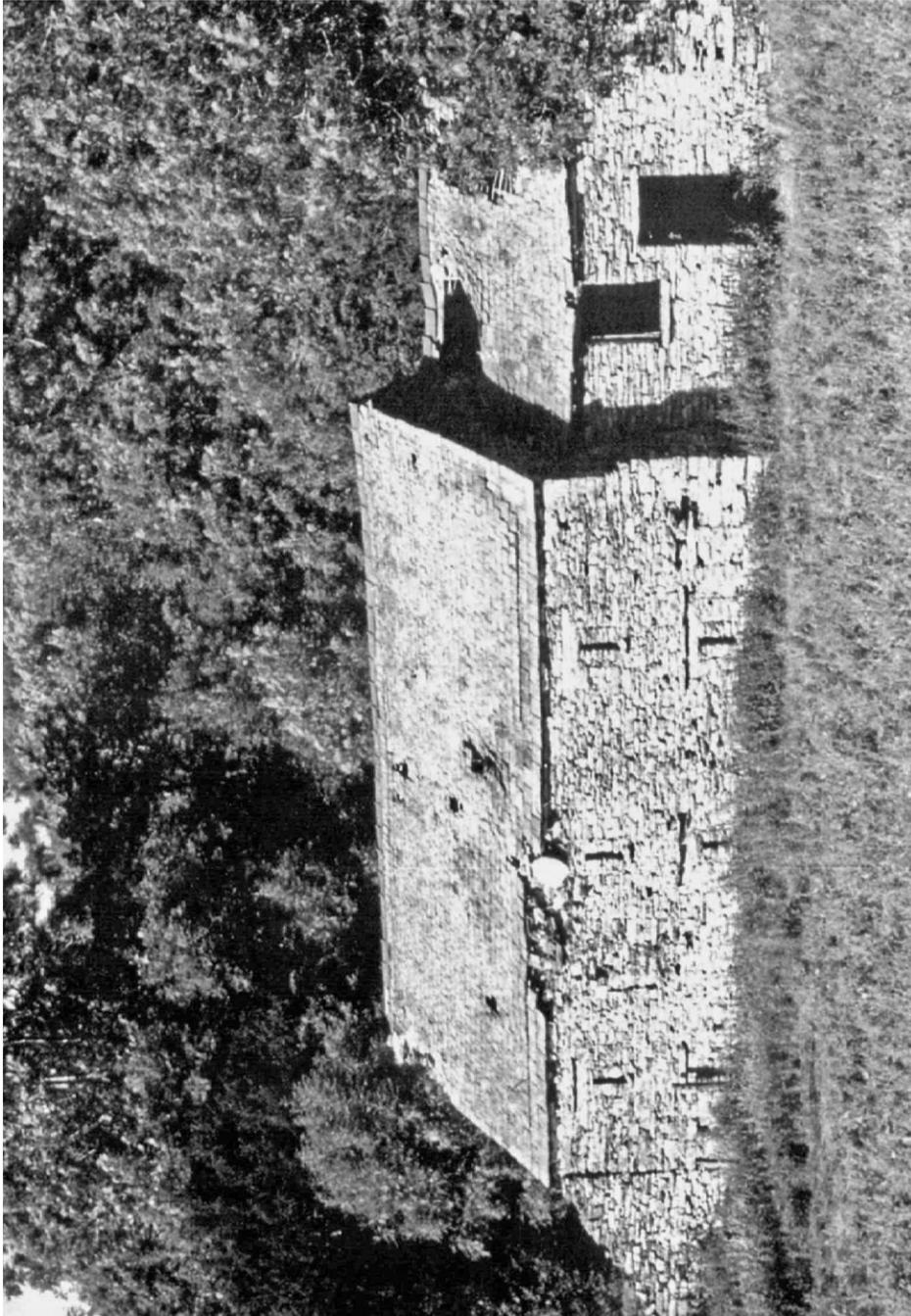


PLATE 1. The principal building and adjacent structure in the 1980s, prior to their demolition (courtesy of M. Davies-Shiel)

Crossfield of Plumpton and John Oliphant of Penrith. In the same year, the Backbarrow Company began the erection of a blast furnace near to the site of the bloomery forge at Backbarrow (CRO(B) BZ5). As partners of this company (Machell and Rawlinson) already owned Cunsey forge, it was absorbed into the Backbarrow Company and used as a refinery in conjunction with their furnace.

During 1713, the bloomforge at Backbarrow was converted to a finery forge (CRO(B) BZ185). Fell (1908, 247) implies that Cunsey forge was similarly “rebuilt and newly equipped in 1713”, although supporting evidence is slight. Production figures for this period (Table 1), for instance, highlight the significant contribution Cunsey forge made to the region’s output of bar iron, and would suggest that it operated throughout 1713, unlike those for Backbarrow. The figure provided for the year 1710, if accurate, is quite remarkable; Awty (1977, 103), for instance, considered the usual output of a Lakeland bloomforge to have been in the region of 20 tons per annum, which suggests that the bloomsmithy at Cunsey may have continued in full production.

TABLE 1. Production of bar iron in tons (source: Fell, 1908, 252)

Forge	1710	1711	1713
Cunsey	68	36.5	43
Backbarrow	36	12	–
Force	23.5	7.5	26
Hacket	19.5	11.5	–

In 1715, the Backbarrow Company’s lease on Cunsey forge expired, and it passed into the hands of the Cunsey Company, who immediately reconstructed the forge and worked it as a refinery in conjunction with their furnace (Fell, 1908, 192). According to Fell (*ibid.*) the bloomsmithy was finally abandoned as part of this reconstruction, although as the bloomforge was already equipped with finery and chafery hearths, it is difficult to envisage what other changes to the site’s infrastructure were undertaken at this time.

Raw materials – iron ore

It is probable that much of the iron ore smelted at Cunsey was obtained from the mines in Low Furness, such as Stone Closes and other mines near Stainton. However, it appears that additional sources of ore were sought; an agreement of March 1694 (LRO DDSa 38/2) between Richard Patrickson, Thomas Addison and Henry Roper demonstrates the parties’ willingness to supply Miles Sandys with iron ore from “pits in Grasmere or any other pits within their lease nearer to Windermere water” for use at Cunsey forge; samples of haematite ore recovered during the excavation in 2003 are consistent with known occurrences in the Grasmere area (B. Young pers. comm.). Fell (1908, 193), citing the toponymy of “Great Ore Gate” and “Little Ore Gate”, also postulated the importation of ore to Cunsey from the iron mines in Langdale and Coniston.

Raw materials – charcoal

The availability of charcoal was crucial to iron production, and the abundance of wood in Furness was a significant factor in the initial growth of the region's iron industry. An agreement between the Penningtons of Muncaster and William Wright, dated 10 April 1623, refers to the sale of all the oak and timber trees at Hacket Ground in Little Langdale for £250 (*op. cit.*, 191). It is presumed that this was aimed at securing an ample supply of charcoal for use at Cunsey forge (Bowden, 2000, 68), although it seems likely that this supply would have been terminated with the construction of Hacket forge in 1630. Oak certainly appears to have been the preferred fuel at the enigmatic iron-working site at Muncaster Head, for instance, as the results of an excavation there concluded that oak accounted for 70% of the wood used (Tylecote and Cherry, 1970, 97). Analysis of charcoal samples recovered from Cunsey forge identified a mixture of diffuse porous roundwood species, either alder or hazel, and ring porous species, including ash and oak (OA North, 2004).

An early-eighteenth-century document, dated to 27 January 1701, refers to William Brathwayte of Bryars in Sawrey Extra agreeing to supply Miles Sandys “50 waynloads of charcoal yearly at Consey forge, for 19s a load if iron sells at less than £15 a ton, and 20s if iron sells at £16 a ton or more” (LRO DDSa 2/18). It is probable that this was only one source of charcoal for the forge, although the only other reference to charcoal supply within the documentary sources is embodied within a lease of Cunsey Estate (CRO(B) Z24), dated 11 September 1750. This was between Miles Sandys and James Machell, William Penney, Fletcher Fleming, Isabel Taylor, Myles Postlethwaite, John Scales, John Russell, James Birkett and John Satterthwaite, and offered numerous liberties, including the right to use the woods to make charcoal. Other sources of charcoal are unknown, although it is likely that the bulk was obtained within 5 km or so of the forge, as Awty concluded with reference to Force forge (1977, 103).

Transport

There are no surviving primary documents that provide information on how materials were transported to and from the forge. However, it is probable that the most important trading route was via Windermere, although transporting goods by boat was not without its problems; in 1726, for instance, the Backbarrow Company complained about George Braithwaite's “bustle about the boats”, and later that his vessels were so overloaded that they had to be lightened by partly discharging on a deep-water shore in order to reach the landing stage in shallower water at Newby Bridge (Hadfield and Biddle, 1970, 205). Boating of charcoal on Windermere and Coniston Water finished in 1783, when the boats were sold (*ibid.*).

Iron ore will also have been transported to the smelting sites by packhorse, and some finished iron goods will have been carried away by the same means. In the years before 1750, for instance, a team of six packhorses made the journey from Hawkshead to Kendal twice a week, while another team of horses made regular trips from Hawkshead to Whitehaven (Taylor, 1983, 127).

Protracted closure

Upon the expiry of the Cunsey Company's lease in 1750, it was thought that their collateral passed to the Backbarrow Company, and that neither Cunsey blast furnace nor forge worked after this date (Fell, 1908, 193). However, Awty (1964, 20) reassessed the evidence cited by Fell, and concluded that Cunsey forge may not have been transferred to the Backbarrow Company until 1762. Details provided by an inventory of stock (LRO DDSa 2/26) and an inventory of goods (LRO DDSa 2/27) at Cunsey forge, compiled on 16 October 1757, add weight to Awty's conclusion. These documents comprise lists of the equipment present in the forge in 1757, which included three forge anvils, nine forge hammers, numerous plates, and an assortment of forge tools. Interestingly, a list of "Smithy Tools", seemingly compiled in advance of their sale, is itemised separately and includes an anvil, bellows, files, stamps, and punches. The inventory of goods also mentions the "chafery, lower fynery, and upper fynery with all appurtenances".

Further evidence for the forge operating beyond 1750 is provided by a contemporary account, written by the Swedish industrialist R.R. Angerstein during his tour of England and Wales in the early 1750s. Angerstein visited several of the ironworks in Furness in 1754, and noted that Cunsey forge was fitted with two hearths for the production of bar iron (Berg and Berg, 2001, 292).

In 1818, the Backbarrow Company was bought out by Harrison, Ainslie and Company who, in 1824, inherited the Cunsey site as part of the Backbarrow Company's concerns (Fell, 1908, 209). The absence of Cunsey forge from Christopher Greenwood's "Map of the County Palatine of Lancaster" (1818) suggests that little remained of the site for Harrison, Ainslie and Company to inherit, and Fell noted that the Backbarrow Company "had to pay a considerable sum for dilapidations" (*ibid.*).

Later developments

The census returns for the parish of Hawkshead provide some indication for the later use of the site. In particular, the returns for 1871 (LRO RG10/4247) reveal that Cunsey forge was occupied at that date by John Askew, his wife Catherine and their son John. The Askews are recorded as "labourers", suggesting that the forge was not used for industrial purposes. A separate entry, that of Margaret Jackson, is also credited as residing at the "Old Forge".

Other than demonstrating an absence of iron-working trades, commercial directories provide little information of the nineteenth- and twentieth-century history of the site. The only entry of relevance is contained within a directory of 1911, which lists William Brockbank as a wood hoop-maker, and gives his address as the "Old Forge, Cunsey" (Bulmer, 1911, 343-4). The use of the woodlands for industries such as this formed an increasingly significant element to the local economy during the nineteenth century, and compensated for a reduced demand for charcoal. However, Brockbank's enterprise appears to have been short-lived, as his business is not listed in directories for subsequent years (Kelly, 1913). Since the 1950s, the surviving buildings were used for agricultural purposes (Plate 1), until their partial demolition during the mid-1980s.

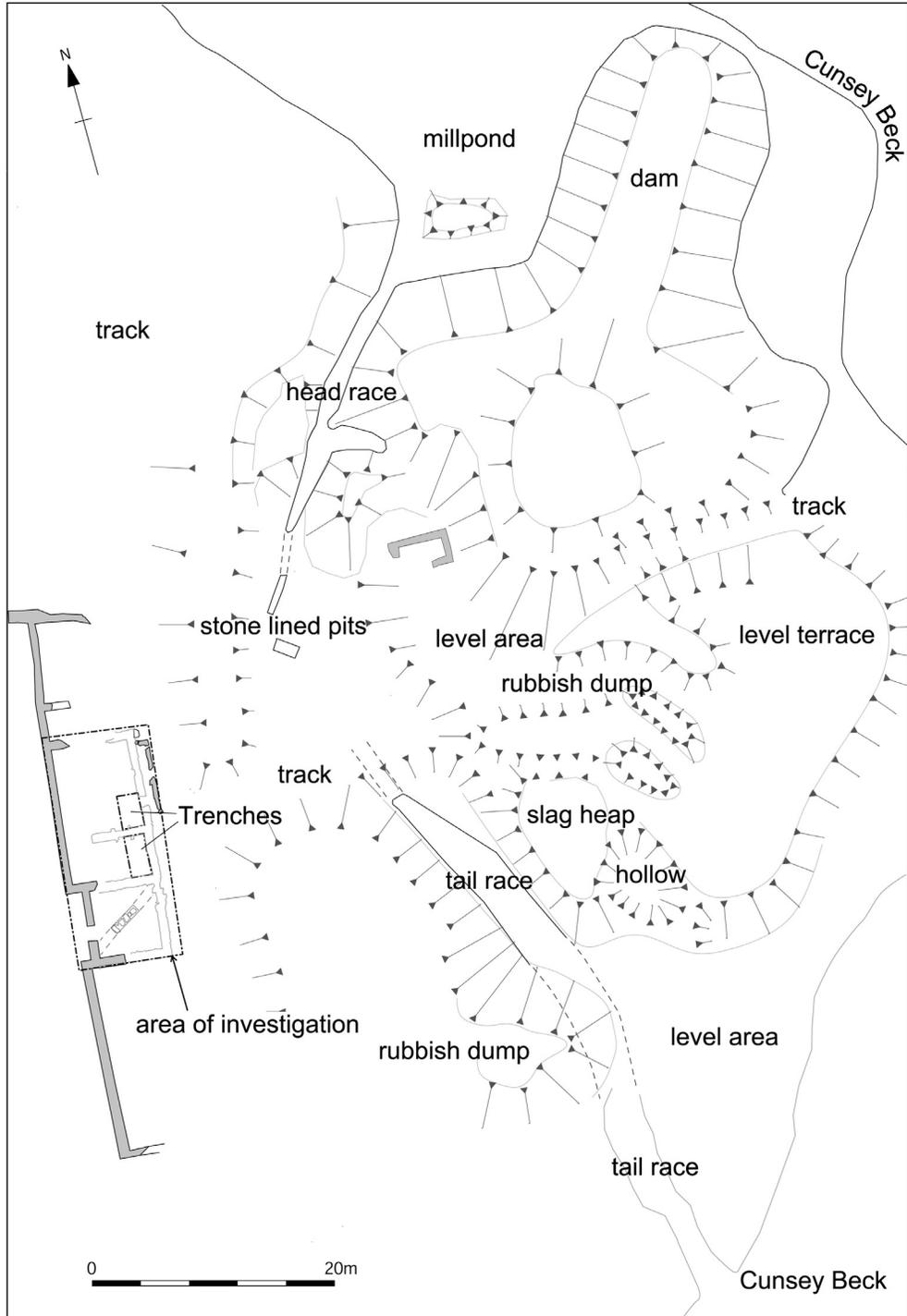


FIG. 2. Site plan, showing area of investigation on the western edge of the forge complex

Site Description

The visible surface features pertaining to the forge complex cover an area of slightly less than 1 ha, which concurs with the two acres mentioned in the lease of 1621 (LRO DDSa 2/5). In spatial terms, the site is divided into two main components by a trackway that runs broadly north-west/south-east between Cunsey Bridge and Eel House. The line of the track is likely to be of some antiquity, and probably provided, at least in part, access to the site from its inception. On the western edge of the track lies a linear range of stone buildings, aligned parallel to the track for a distance of some 47 m. The archaeological investigation was focused on two adjoining stone buildings in the centre of the range (Fig. 2), whilst immediately adjacent to the north are two smaller buildings, which are cut into a terrace at a slightly higher level.

The south end of the range comprises the vegetation-infested remains of a single large stone building, some 16.94 m long (Fig. 2). The west wall of this structure is extant, but other elements were demolished some time ago (D. Walker pers. comm.). The surviving wall does not contain either windows or doors, suggesting it to represent the remnants of the charcoal barn, despite an absence of visible charcoal staining on either the walls or the stone slab floor. Several floor slabs have been removed, exposing a concentrated deposit of iron-working residues, which demonstrate that this building was not a primary structure.

The surviving remains to the east of the track provide substantial evidence for the primary stages of iron-working, and are likely to represent the focus of such activity. In order to place the excavated part of the site in its context as a component of the entire iron-working complex, a summary description of this area is useful.

The northern extent of the complex is marked by a large depression, which represents the former millpond. The eastern edge of the millpond is retained by a 2 m high dam across the valley floor from the southern edge of Cunsey Beck; it is presumed that the “floodgates” mentioned in an indenture of 1647 (CRO(B) BD/HJ/89/8) would have been fitted to the dam to regulate the flow of the beck. A well-constructed stone wall, some 7 m in length, at the northern terminus of the dam, may have been associated with such a structure.

A rock-cut channel leading from the southern edge of the millpond probably formed the head race to the forge via which water was directed to a waterwheel. A short section of the channel is lined with a stone wall, which incorporates several hearth bottoms, or “mossers”, in its build. The head race terminates close to a rectangular stone-lined pit, measuring some 3.5 m long, whilst a second stone-lined pit lies a short distance to the south (Fig. 2). Both structures are currently partially obscured by modern dumping, although it is tempting to interpret them as waterwheel pits; one water wheel may have been connected to the forge bellows, and the second to drive the hammer. The remnants of another rectangular stone structure lies to the north, the function of which remains unclear. A water channel that emerges from beneath the modern track, and continues along a southerly direction to join with Cunsey Beck (Fig. 2), almost certainly represents the tail race from the forge.

The area to the east is dominated by massive slag tips, which extend south-east parallel to the beck for a distance of at least 50 m. The tips include numerous hearth bottoms, providing testimony to the considerable amount of iron-working undertaken on the site. The slag tips are bounded to the north by a trackway that



PLATE 2. View across the principal building during excavation

leads to the beck. Its position corresponds to a ford shown on the first edition Ordnance Survey map of 1851, although it would seem likely that this crossing point was abandoned when the dam was breached, as the flow of water in the beck is too strong for safe passage.

Project Background

During the 1980s, the surviving elements of the forge were largely demolished, leaving only a few walls standing. In June 2002, the LDNPA Archaeology Service was notified that these fragmentary remains had sustained further demolition; the end wall and part of the rear wall of the building had been demolished, and the floor had been substantially disturbed, revealing various features of archaeological significance including areas of *in situ* concreted metal-working waste.

A scheme of archaeological investigation was therefore proposed by the LDNPA Archaeology Service, which, in the short term, was designed to examine and record the features and deposits exposed within the damaged structure (Plate 2), and included a limited programme of geophysical survey. In the medium term, the consolidation of the remains of the structure was anticipated, and the burying of the exposed deposits beneath a geotextile layer. It is also proposed that the remainder of the site be recorded via topographical and geophysical surveys, and that a management programme be developed for the longer term.

The Geophysical Survey

A geophysical survey of the site, undertaken by Engineering Archaeological Services Ltd. during an early stage of the excavation, comprised a magnetometry survey, which is considered to be the best technique for identifying iron-working activity. This was focused on the interior of the ruined building, and a *c.*5 m wide strip to the east. Informal magnetic scanning was also undertaken along the side of the track to the south-east, which identified anomalies some 30 m away from the building. The nature of these was not determined, although a coherent di-polar anomaly was identified immediately to the north-east of the building, on the edge of the excavation area (Fig. 3). This anomaly was roughly circular and approximately 1 m in diameter, and was reminiscent of similar magnetic responses recorded on bloomery furnace sites elsewhere in Cumbria (Brooks, 2003, 2), providing a tantalising hint of the putative medieval bloomery/bloomsmithy. However, the anomaly was identified beneath a cobble surface (*06*; Phase 4) and beyond the limit of the excavated area, and its interpretation as a bloomery furnace therefore has not been corroborated.

The survey also recorded several areas of magnetic disturbance within the excavated area, and particularly within the south-eastern part the building. The results indicated that this had been the focus for activity which resulted in a considerable disturbance of the magnetic field, such as would be expected with iron-working.

The north-western half of the excavated area contained a lower level of magnetic disturbance, suggesting that the two parts of the building had been subjected to different use (*ibid.*).

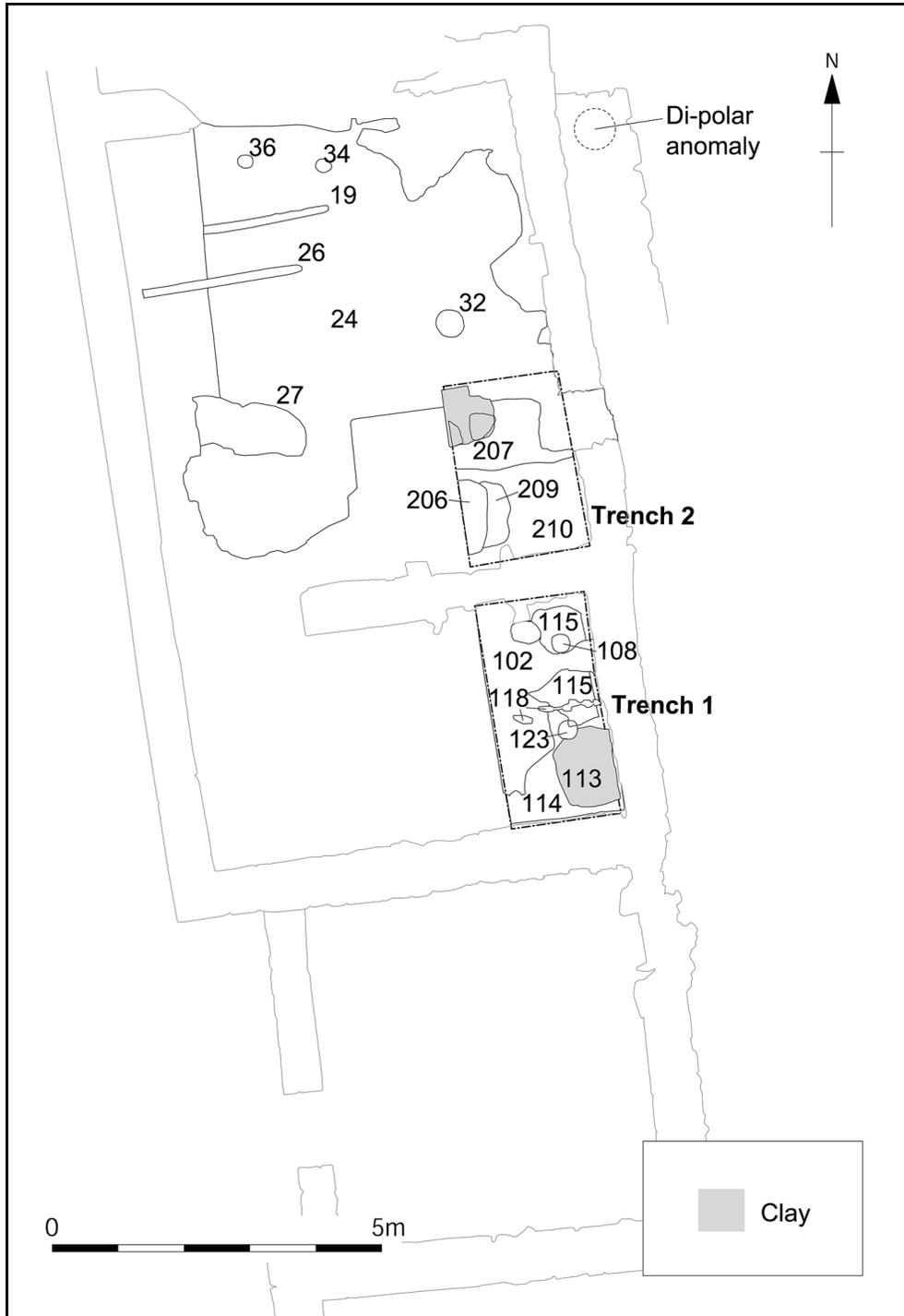


FIG. 3. Archaeological evidence for Phase 2: the bloomforge

The Excavation

The excavation comprised two main elements: the manual cleaning of rubble and other detritus from the site, followed by the excavation of two trenches within the footprint of the largest, or principal, building (Fig. 3).

In the following narrative, a broad phasing has been allocated to the archaeological activity identified in the field. This phasing equates with major events in the evolution of the site, and corresponds to those identified in archival sources.

Phase 1: The Bloomery/bloomsmithy?

The archaeological investigation did not yield any definite physical evidence for the iron-working on the site during the medieval period that is suggested from documentary sources. However, a layer containing large amounts of iron-working residues that were broadly consistent with bloomery slag was identified. This was exposed below the floor level of the later iron-ore store (Phase 3), whilst similar residues were observed to underlie the floor of the putative charcoal barn (Phase 3). However, as these areas were not formally investigated, it could not be ascertained confidently whether these deposits had derived from Phase 1 or Phase 2.

Phase 2: The Bloomforge (c.1618-1715)

Physical evidence for the bloomforge, or its associated bloomsmithy, was firmly identified during the excavation, although the shallow nature of the exposed features implied that the structures had been insubstantial. Moreover, the programme of archaeological work was designed to have a minimal negative impact on the site, and therefore only a fraction of the earliest features and deposits was exposed.

Evidence for structural remains was drawn from two parallel linear features (**19** and **26**) and two shallow postholes (**34** and **36**), which were all exposed within the northern part of the site (Fig. 3). Excavation of the linear features revealed them to have vertical sides and flat bases, aiding their interpretation as timber sill beams for an insubstantial structure. The southern extent of feature **26** had been obliterated by a foundation trench for the ruinous building, implying that the insubstantial structure had been replaced during Phase 3. The western terminus of feature **19** correlated with the distinct, linear western extent of a widespread layer (**24**), implying this to have been the position of a partition at right angles to **19** (Plate 2). The absence of any other structural remains that could be associated with this partition hinted that this might have been formed from sheeting rather than a solid wall. Postholes **34** and **36** lay to the north, and whilst no rationale for their presence can be offered, it seems possible that they may have been associated with the sill beams.

A larger posthole (**32**) that lay to the south-east appeared to be associated with a deposit of compact, burnt clay (**207**), which was exposed a short distance to the south within Trench 2 (Fig. 3). It is suggested that clay **207** represented the vestiges of a hearth, and posthole **32** marked the position of an item of iron-working equipment, such as a small anvil. Evidence for iron-working within this part of the site was provided by several deposits, including charcoal-rich lens **27** and layers **206**, **209**, **210** and **24**, which contained abundant nodules of iron slag and yielded a coin of William III dated to A.D. 1695-99.

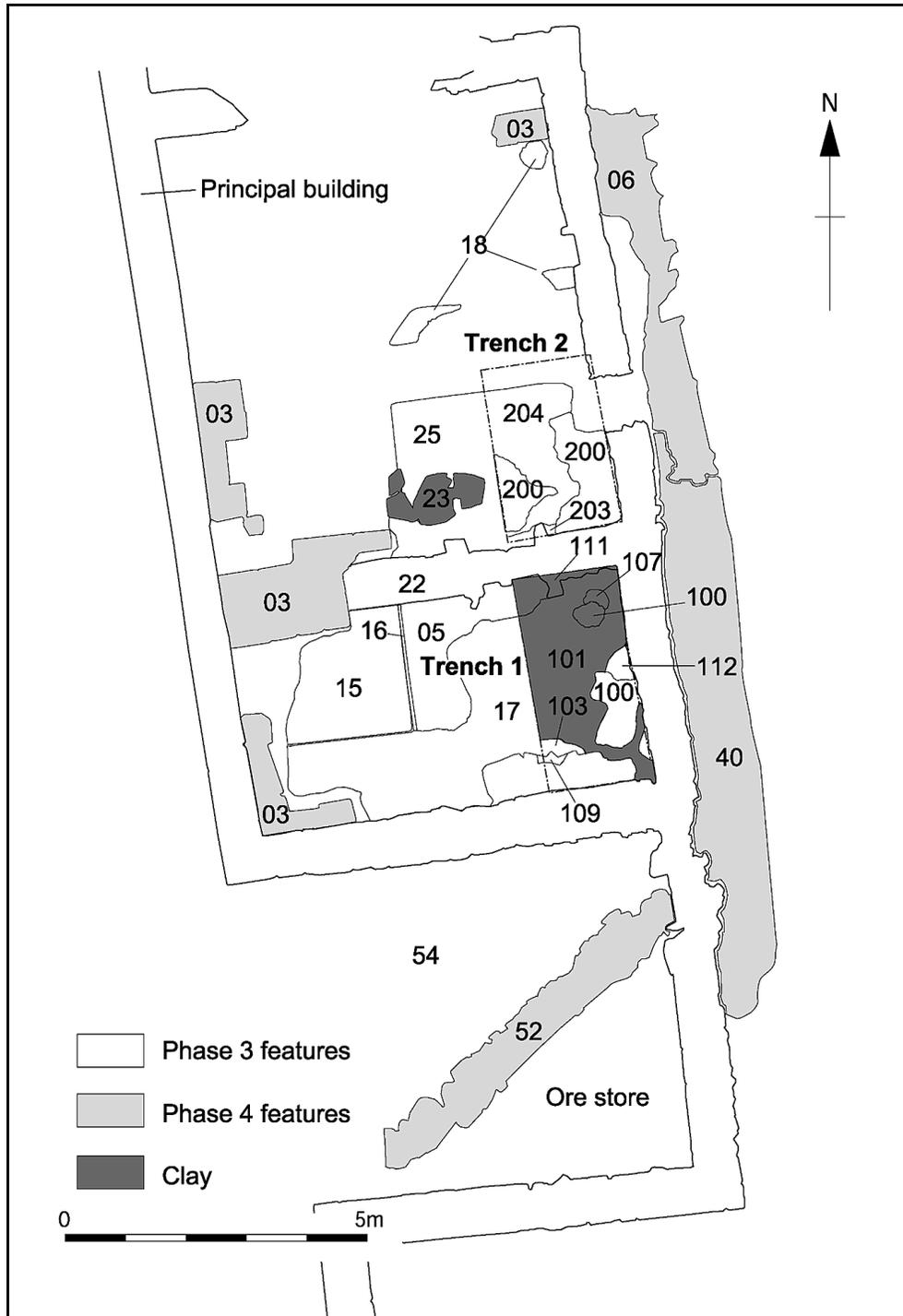


FIG. 4. Archaeological evidence for Phase 3 and Phase 4: the refining forge and later developments

Within Trench 1, to the south, a spread of compact, burnt clay (**113**) was interpreted as the remnants of another hearth (Fig. 3). This had been cut by the foundation trench (**111**) for the stone building (Phase 3). Hearth **113** appeared to be associated with a large posthole (**123**) that survived to a depth of 0.3 m and contained numerous large stones indicative of disturbed post-packing, and a series of large, flat stones (**118**) placed vertically into the subsoil. Stones **118** were aligned east/west immediately to the north of posthole **123** and hearth **113** (Fig. 3), and had seemingly been intended as packing material for a timber sill beam, perhaps representing a structural element of the hearth.

Thin layers that contained degraded charcoal and nodules of iron slag encompassed these features. In particular, a layer of very dark grey/black gritty clay (**102**), which had an average thickness of 0.03 m, was exposed across much of the trench. This layer had clearly been cut by foundation trench **111** (Phase 3), indicating that layer **102** originated from an earlier phase of activity. Additionally, a farthing of Charles II, dated 1670-80, was recovered from a similar layer (**114**) of iron-working detritus. The nature of these deposits suggested that features **113**, **118** and **123** all represented the foundation elements for iron-working equipment.

Another posthole (**108**) lay to the north, the fill of which (**107**) yielded fragments of pottery dated to the late-seventeenth or early-eighteenth century, which had presumably been deposited when the post was removed (Phase 3). This posthole was similarly encompassed by layers rich in degraded charcoal and iron-working debris. One such layer (**115**) was up to 0.11 m thick and contained a dense concentration of degraded charcoal in the immediate vicinity of posthole **108**.

Phase 3: Refining Forge (c.1715-62)

A significant stage in the development of the site was the construction of the stone buildings (Fig. 4), which appears to have represented a remodelling of the complex and the replacement of the insubstantial, and presumably wooden-framed, structures associated with the bloomforge or bloomsmithy. The excavated area had clearly been dedicated to iron-working during this phase, although the processes undertaken were apparently ancillary to the smelting and forging of the iron. It is possible that the area had been occupied by a blacksmith or other metal-craft worker, which adds a hitherto unexpected dimension to the forge complex.

The principal building erected during this phase had internal dimensions of 11.5 m by 6.5 m, and was formed by walls that incorporated a mixture of large sub-angular stones and freestone blocks in their build, with smaller sub-angular stones utilised for core material. Excavation revealed the footings of the external walls of the principal building to have been cut into Phase 2 deposits, whilst a coin retrieved from the fabric of one wall has been dated to 1714.

The principal building was effectively divided into two, broadly equal, components by a substantial internal partition wall (**22**). This was set into a 0.20 m deep construction trench (**203**), the fill of which (**202**) yielded fragments of pottery of an early-eighteenth-century date. Wall **22** incorporated a symmetrical feature in its build, the plan form of which was reminiscent of a double-breasted fireplace (Plate 3). However, there was no indication for this structure having been subjected to heat, although the possibility that it represented the base of a chimney flue cannot



PLATE 3. Trench 1, showing wall 22 to the left.

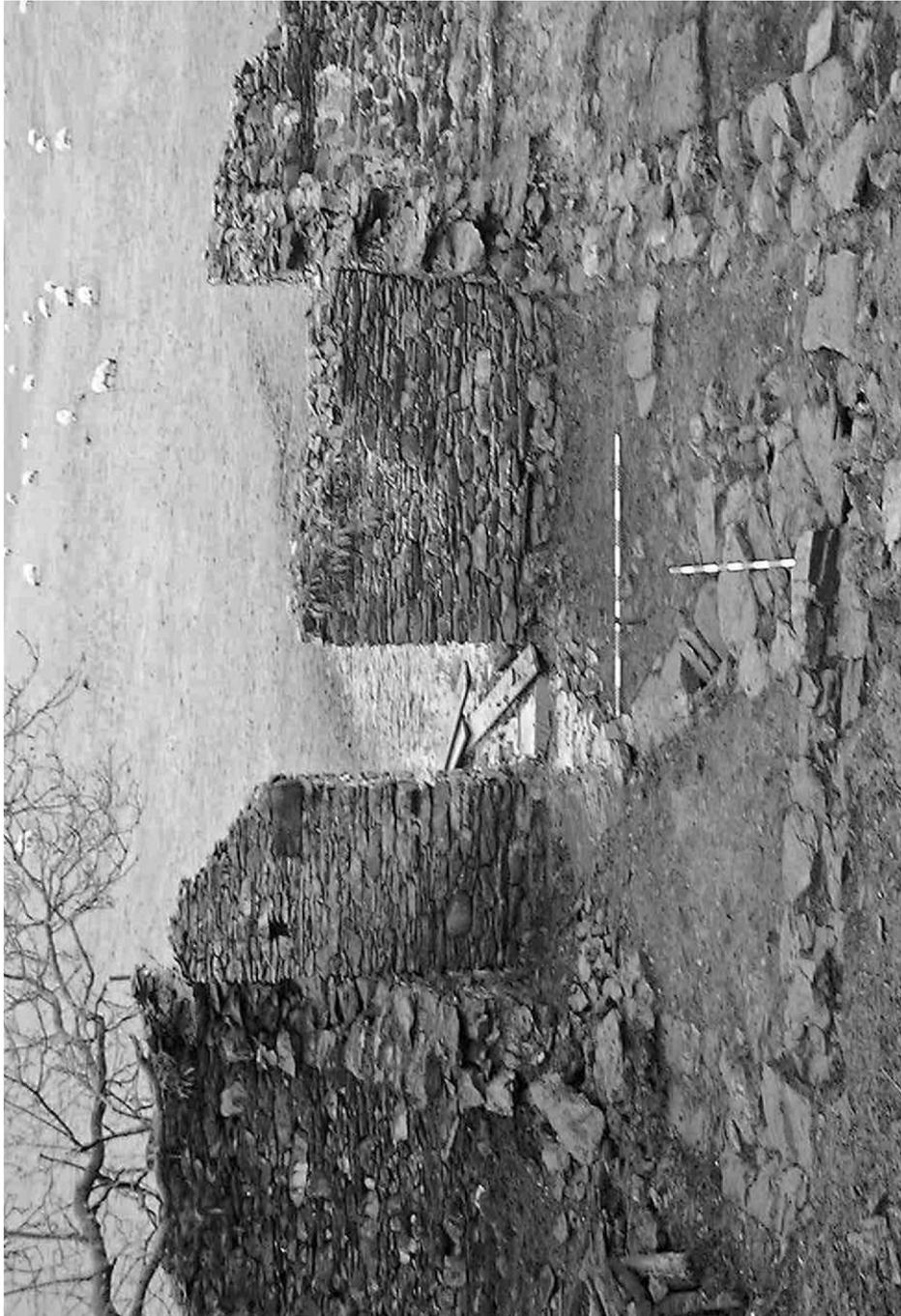


PLATE 4. The ore store

be discounted. It appeared to have been associated with a series of five, carefully placed and closely-packed, large stone slabs (**23**), situated immediately to the north of wall **22**. The central slab had been discoloured as a result of exposure to extreme heat, suggesting that it had formed the base of a hearth. The stones had been set onto a rectangular area of compacted clay (**25/204**), which, in the vicinity of stones **23**, had been similarly discoloured by high temperatures. Clay **25/204**, which measured some 3 m square and 0.05 m thick, contained dense concentrations of charcoal flecking and iron-working residues (**200**) in its upper surface, implying it to have formed part of a workshop floor. Corroborating evidence was provided by the presence of small patches of smithing waste, which were exposed to the north of floor **25/204**.

Another compacted clay floor (**15**), measuring 2.2 m by 2.1 m, was revealed to the south of partition wall **22** (Fig. 4). The eastern edge of floor **15** was bounded by the remnants of a timber sill beam (**16**), which presumably marked the position of an internal partition. The vestiges of another clay floor (**101**) were identified across the eastern part of the trench. This had a uniform thickness of 0.02 m, and covered an area measuring some 3 m by 1.3 m. Situated between these two clay surfaces were extensive layers of indurated smithing waste (**05/100/109/112**), effectively forming a floor, and associated deposits of industrial detritus, **17** and **103**.

The indurated smithing waste is likely to have been the cause of the considerable magnetic disturbance detected by the geophysical survey. This was concentrated within the south-eastern part of the principal building, whilst lower levels of magnetic disturbance were noted to the north-west. These results, combined with those obtained from the excavation, implied a different use for the two halves of the building, and that metal-working activity had been centred to the south of wall **22**. A slight plume of magnetic disturbance was noted to lie over the line of the track in front of the building at its south-eastern end, and beyond the area examined by excavation, suggesting that a door had opened onto the track at this point.

The structure adjacent to the southern end of the principal building measured c.8 m by 5.5 m, and was similarly composed of large stone slabs and occasional freestone blocks (Plate 4). This structure was clearly of the same build as the principal building, but had originally been open-fronted to the south-west, broadly facing Great Ore Gate and Little Ore Gate (Fig. 1). Excavation revealed that the structure contained a 0.20 m thick deposit of haematite ore fragments in a matrix of bright reddish-brown clay (**54**), indicating that the building had been used as an ore store.

Phase 4: Later Developments (Post-c.1762)

The principal building was later modified to accommodate a change in function, notably by the reduction of the central partition wall (**22**) to its foundation. This, together with smithing waste **05** and other deposits representing secondary iron-working activity, were overlain by a sequence of bedding layers for flagstone floor **03**. The floor had been largely disturbed, but remained *in situ* across the western part of the building (Plate 2). A cobble surface (**06**), which was external to the building and bounded the north-eastern edge of the site, was seemingly of a contemporary date.

The thick deposit of haematite exposed within the ore store had been cut by a large culvert (52), aligned broadly north-east/south-west across the excavated area (Plate 4). This appeared to channel water into the tail-race from the forge, situated on the opposite side of the track. The west wall of the ore store, clearly of a later date to the other walls, may also have been constructed at the same time to form an enclosed structure.

A small range of artefacts, including fragments of window glass and pottery of nineteenth- and early-twentieth-century date, was recovered from a soil horizon (40), which was exposed along the front of the building, and extended beneath cobble surface 06. These seemingly represented domestic activity on the site, presumably associated with its documented occupation during the late-nineteenth and early-twentieth centuries (Phase 4).

The Finds

A moderately-sized finds assemblage was recovered from the excavation, and included fragments of pottery, clay tobacco pipes, coins, ironwork, glass, animal bones, and ceramic building materials. The most interesting of these material categories were the pottery and the coins, as these furnished dating evidence and an indication of the material culture associated with the forge.

The pottery: the site yielded a total of 167 fragments of pottery, representing a range of fabric types in several kitchen and tableware forms, some of which had undoubtedly been imported to the area from outside of the region.

As may be expected, much of the assemblage was of a mid- to late-seventeenth- or early-eighteenth-century date and may therefore be associated with an occupation of the forge, although a proportion represented domestic activity on the site during the nineteenth century.

The pottery recovered from the stratified Phase 2 deposits was of a date centred on the late-seventeenth and early-eighteenth centuries. The range of fabric types included Blackwares, Yellow wares, Slipwares, Mottled wares, salt-glazed stoneware, and utilitarian dark-glazed earthenwares (Table 2). It is unlikely that any of these were manufactured locally, and some may have been brought via the coast from Merseyside or the Midlands.

TABLE 2. Breakdown of the pottery in Phase 2 deposits

Context no	24	102	113	115	207	209	210
Blackwares				x	x	x	
Slipwares				x		x	
Yellow Wares				x			
Mottled Wares				x		x	
Salt-glazed stoneware		x					
Dark-glazed earthenware	x		x				x

The same range of fabrics was present within the Phase 3 deposits, although these also included a numerically significant proportion of distinctive Staffordshire Slipwares (Table 3). Whilst slipware was produced at a number of centres throughout the country, the distinctive Staffordshire products dominated the market

during the late-seventeenth and early-eighteenth centuries, and its occurrence within the assemblage further implies trading links with the Midlands.

The pottery assemblage also reflected exclusively domestic use; the ceramics provide no indication of specialist or industrial function, but do indicate that the forge had been occupied residentially. The quality and range of the wares implies that the forge was economically prosperous during the seventeenth and early-eighteenth centuries, reflecting the significance of the iron-working trade. The relative affluence of the site implied by the pottery is not frequently associated with rural sites of this period although, in advance of the analysis of a sizeable assemblage recovered from excavations at Stony Hazel forge (situated some 4 km to the south-west; Fig. 1), there are no published examples of comparative material from within the region.

TABLE 3. Breakdown of the pottery in Phase 3 deposits

Context no	16	101	107	202	204
Blackwares	x				
Slipwares		x	x		
Staffordshire Slipwares			x	x	
Mottled Wares					x
Dark-glazed earthenware			x		x

Pottery of a characteristically nineteenth-century date was recovered from several Phase 4 deposits, including the initial cleaning layers **01** and **02**, deposit **40** and the fill (**51**) of the construction trench for the culvert within the ore store. The pottery from these layers was dominated by fragments of dark-glazed earthenware jars and pancheons, but also yielded fragments of dinner wares with Asiatic Pheasant and Willow pattern decoration, sponge ware tea vessels and an industrial slipware carinated bowl. These layers also contained pottery fragments of a probable eighteenth-century date, which are likely to have been residual. In particular, initial clearance layer **01** and deposit **40** yielded fragments of decorated tin-glazed earthenware. Very few stratified groups of such pottery have been recovered from the region as a whole, and the range of vessels produced, and their distribution, is not well understood. Nevertheless, it is likely that the tin-glazed earthenwares were the products of either the Delftware industry in Liverpool, which was established by the early-eighteenth century (Davey, 1987), or that which operated on St George's Quay, Lancaster, between 1754 and c.1787 (Archer, 1997). These are the closest known production centres to the Furness region (*ibid.*), and their presence within the assemblage again implies trading with these West Coast ports.

The coins: four coins were recovered from stratified contexts during the course of the excavation. The coins were all late-seventeenth- or early-eighteenth-century issues and provided close dating for the structures and deposits from which they were retrieved (Table 4).

Three of the coins were found within layers containing industrial detritus associated with the operation of the bloomforge, and had presumably been lost by the iron-workers. It is curious that these remained undiscovered within the working area, no one seemingly expending any effort for their retrieval. As was noted of the pottery assemblage, this factor again hints at an element of wealth on the site.

TABLE 4. Summary of the coins

Context no/ Object no	Phase	Material	Issues	Date Range
24//1035	2	Copper alloy	William III, farthing, first issue	1695-99
102/1040	2	Copper alloy	William III, halfpenny	1695-1701
114/1060	2	Copper alloy	Charles II, farthing	1670-80
08/1087	3	Copper alloy	Anne, farthing	1714

A farthing issued during the reign of Queen Anne was of particular interest, as it was recovered from between the stones forming one of the walls (**08**) of the principal building, and had perhaps been deposited deliberately during its construction. The coin has been dated to 1714, providing corroboration for the documented period of reconstruction of the site undertaken by the Cunsey Company in 1715 (Fell, 1908, 192).

The glass: the excavation produced a small assemblage of glass from stratified deposits, although all of the fragments were small. Nevertheless, fragments from layers **102** and **114** represented three different drinking vessels (Phase 2). Three fragments of glass recovered from layer **24** (Phase 2) were possibly derived from a lantern, hinting at the mechanism by which lighting was provided within the forge.

A single sherd of window glass recovered from the fill (**202**) of a foundation trench (Phase 3) provided rare physical evidence that elements of the forge complex had been fitted with glazed windows.

The remaining artefacts recovered from the excavation add little to an interpretation of the site. However, the paucity of ironwork, other than 16 nails, implies that any equipment associated with the forge had been stripped out prior to demolition.

Conclusions

The remains at the site of Cunsey forge as a whole are substantial and extensive, and provide one of the best surviving examples of a bloomforge/refining forge in the region. Both types of site are comparatively rare, and are generally poorly understood due to lack of research; current definitions of bloomforges and refining forges are based largely on the results of the two separate programmes of excavation at Stony Hazel forge (Davies-Shiel, 1970; Cranstone, 1985), which have resulted in differing interpretations.

The archaeological investigation of Cunsey Forge has provided an initial survey of the site and a valuable opportunity to examine an element of Cunsey forge that was hitherto considered to be ancillary to iron-working *per se*. However, whilst further fieldwork close to the putative wheel pits may confirm that area to have been the focus of the refining forge, iron was undoubtedly worked within the study area during the period following 1715, particularly within the south-eastern part of the building. The precise nature of this industrial activity remains uncertain, although the making and repairing of forge equipment, or even the actual manufacturing of iron goods for sale, would seem to be distinct possibilities.

The refining forge appears to have supplanted a bloomsmithy or bloomforge of seventeenth-century origins. The physical remains for this were scant, which perhaps

reflects the insubstantial nature of such structures; a study of the seventeenth-century Force forge (Awty, 1977) concluded that it had made extensive use of timber in its build, and it seems likely that Cunsey forge was similarly timber-framed, perhaps in-filled with leather sheeting. The complete size of this building could not be discerned, although the working floor exposed within the excavated area was at least 6.6 m by 5 m. It appears to have been increased substantially as part of the early-eighteenth-century remodelling of the site, which, notably, included a transition from wooden to stone construction. This reflects significant changes in the iron industry as a whole during this period, and an expansion of the Cumbrian industry to serve increased demands for iron throughout the country.

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