

SCARBOROUGH ARCHAEOLOGICAL AND HISTORICAL SOCIETY

**A SURVEY OF THE FORGE, FORGE VALLEY
SCARBOROUGH**

By Trevor Pearson and Martin Bland



Scarborough Archaeological and Historical Society
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A SURVEY OF THE FORGE, FORGE VALLEY, SCARBOROUGH
NORTH YORKSHIRE

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NGR SE 98449 87104

National Monument Number 1573569

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1. Introduction

In the spring of 2019 the Scarborough Archaeological and Historical Society (SAHS) undertook a 1:500 scale archaeological survey of the site of Ayton Forge in Forge Valley, near Scarborough (NGR SE 98449 87104). The survey is part of the Society's on-going research project into the history and development of Forge Valley, Raincliffe and Row Brow Woods which together extend for five miles from Forge Valley in the west along the steep north slope of East Ayton, Seamer and Irton Moors to Racecourse Road (A170) in the east (Figure 1). In 2016-17 the Society completed the first archaeological survey of the woods which preserves a wide range of features from prehistory to the 20th century (SAHS 2018). These remains include over 30 platforms, most of which may have been for charcoal burning to provide fuel for the forge. It was therefore decided to investigate the forge in more detail to try and understand its development and its role in shaping the historic landscape.

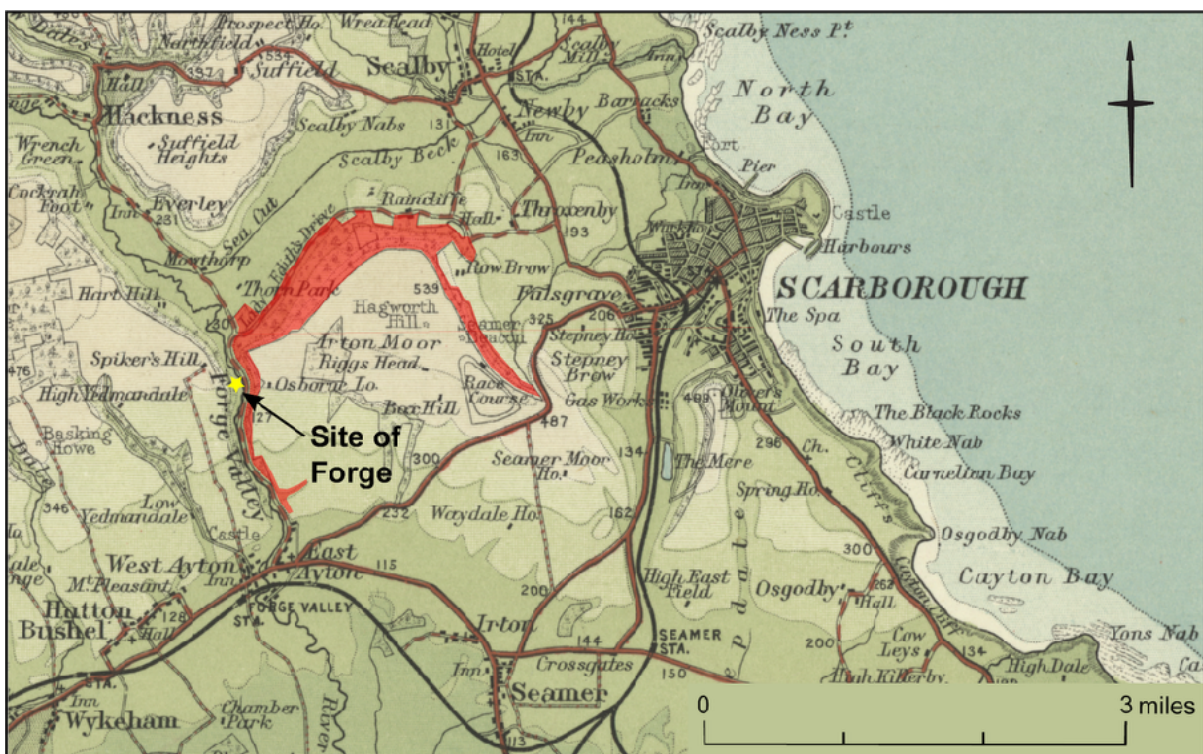


Figure 1. Bartholomew half inch to the mile scale map published in 1903 showing the location of the forge site and the extent of the woods surveyed in 2016-17 (in red).

The forge was active in the 1700s but ceased production by the end of that century. It was situated about 500m from the north end of the valley on the east side of the river Derwent but no detailed plans or descriptions of the forge have yet been found from when it was in operation. However, early editions of large-scale Ordnance Survey maps show a number of buildings on the site in the 19th century that could have been part of the 18th century forge. These buildings are demolished and today the site is mostly occupied by a small public car park and picnic area. The land is owned by Scarborough Borough Council and managed by the Raincliffe Woods Community Enterprise. The site of the forge is within Raincliffe and Forge Valley Woods Site of Special Scientific Interest (SSSI). The forge was assessed briefly as part of the Society's 2016-17 woodland survey (SAHS 2018, 31-3) but the present report gives a more detailed account based on the results of the 2019 survey combined with the findings from on-going documentary research.

2. Site location

Forge Valley was formed at the end of the last Ice Age as glacial meltwaters carved a 2.5 km long channel southwards through the Tabular Hills into the Vale of Pickering along a course which is now followed by the river Derwent. The Derwent rises on the moors 16km to the north and flows southwards down the valley to enter the Vale of Pickering at Ayton where it separates the villages of East and West Ayton. It has been known as Forge Valley since the 19th century but in the medieval period was called Adale (Martin 1911, 119), possibly derived from the Old English 'Adela' meaning 'dirty, muddy place' (Mills 2011, 10).

The valley floor here is about 50m wide with very steep sides on both sides rising over 80m. The forge site is at a height of around 40m OD and is several metres above the present level of the river. The car park covers the south part of the site with a grass picnic area to the north beyond which, (and possibly still within the area of the forge) a shoulder of bedrock pushes out from the east side of the valley creating a distinct ridge several metres high as far as the river's edge (Figure 2). Up until the 1950s a row of houses called Forge Cottages stood on top of the ridge but the area has reverted to woodland. A path leads via a boardwalk from the car park along the river bank to a wooden footbridge 35m to the north from where a number of routes head up and down the west side of the valley. The car park is accessed from the East Ayton to Hackness road which follows the bottom of the slope on the east side of the valley. Near the forge site there are several springs above the road, including one issuing out of a rock by the the road side just to the south of the car park called 'Old Man's Mouth'.

The site has not been investigated in any detail before though an English Heritage report in 2003 assessed the site with a view to giving it scheduled monument status (Pastscape Monument Number 1573569 http://www.pastscape.org.uk/hob.aspx?hob_id=1573569). The report noted an area of dense slag to the west of the car park and foundations and ruined wall fragments on an area of higher ground to the north of the car park, correctly identifying the latter as the foundations of Forge Cottages. It concluded that the most likely location for the forge buildings is under the present picnic area on the north side of the car park but did not recommend the site for protection as a scheduled ancient monument due to the limited evidence available.

The 2019 survey area extended for about 120m along the valley from woodland to the south of the car park northwards on to the ridge formerly occupied by Forge Cottages. The Derwent marked the limit of survey on the west while the road was the east limit. The survey involved hand-measurement using tape and offset techniques from an initial base line established along the length of the site. Some hard detail such as the road and fence lines were taken from modern large-scale Ordnance Survey mapping and adjusted with reference to the on-site base line. The overgrown nature of some parts of the survey area severely limited the mapping process by obscuring the ground surface but no attempt was made to clear these areas because of the SSSI status. In addition to the ground survey, a core was taken in the picnic area to establish the nature of the below ground deposits (Appendix 1).

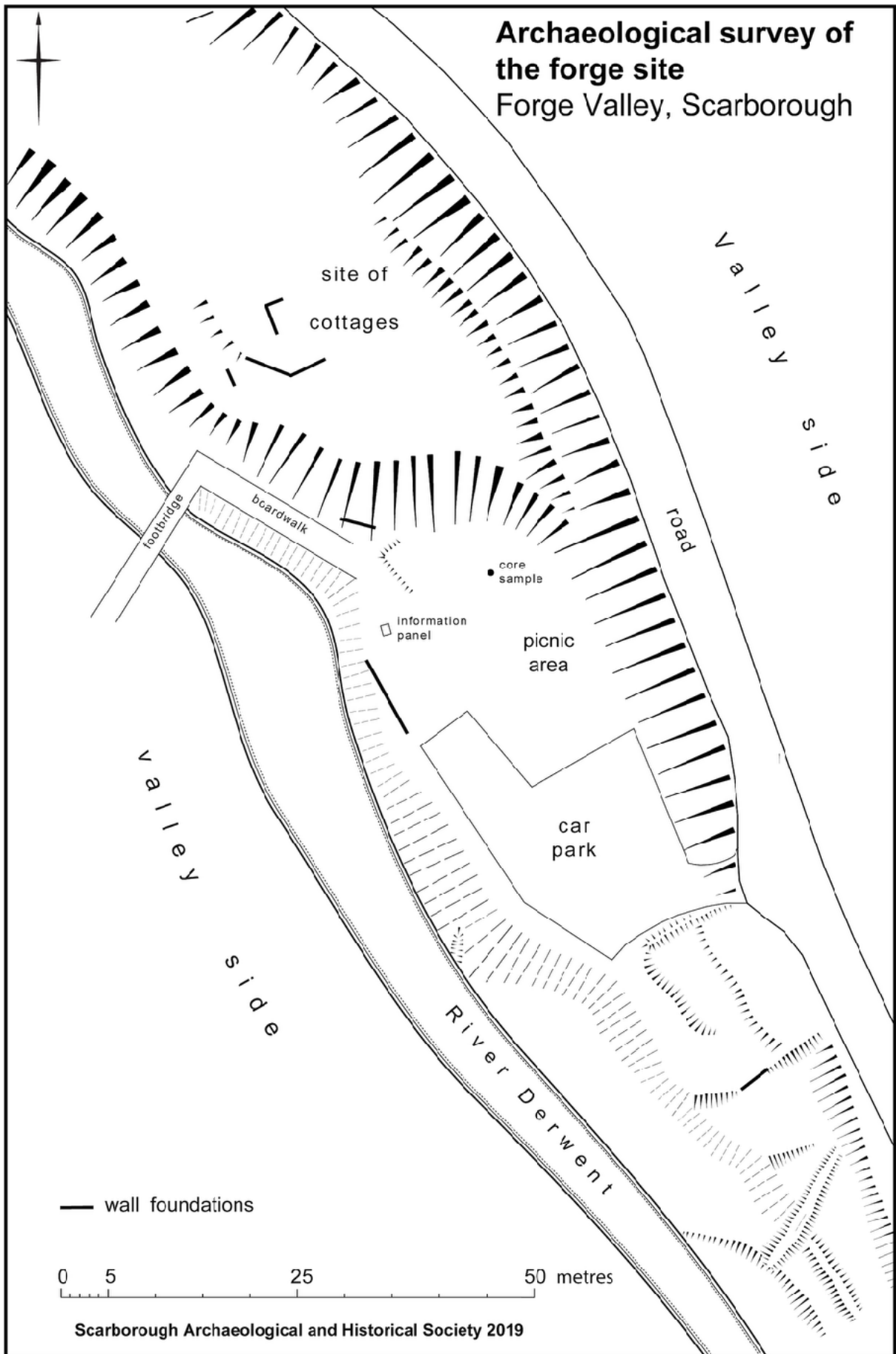


Figure 2. The 2019 archaeological survey plan reduced from 1:500 scale.

3. History of the forge

3.1 Archaeological and historical Background

It is quite clear from the local archaeological record that communities in this area had access to the materials and the technology needed to produce iron for several thousand years. For example an Iron Age site at Cayton recently excavated by Northern Archaeological Associates uncovered a sub-rectangular pit containing charcoal, slag and fired clay interpreted as the base of a furnace for smelting iron (Tabor and Cooper 2007, 5).

The excavations of a Romano-British settlement at Crossgates found extensive evidence of iron working dating to the 1st and 4th centuries AD (Rutter and Duke 1958, 64) while in Harwood Dale extensive remains survive of a medieval iron-smelting site at Cinder Hills (Pastscape Monument Number 65811 http://www.pastscape.org.uk/hob.aspx?hob_id=65811).

In 1334 Henry Percy, Lord of the manor of Seamer which included that part of Forge Valley east of the Derwent, gained the right from the king to dig for minerals and to have forges in Seamer Woods which encourages the idea that bloomeries for making iron could have been present in the valley and in the surrounding woods several centuries before the establishment of the 18th century forge (Page 1923, 486; McGeown 2015, 33). Indeed recent unpublished fieldwork identified a mound recorded in the 2016-17 survey in Raincliffe Woods to the north-east of Forge Valley as a possible bloomery site where iron was produced in a small kiln (SAHS 2016-7 Survey Ref. 260317-022).

3.2 The 18th-century forge

Ayton Forge was leased by the Duke of Leeds to John Cockshutt of Huthwaite near Thurgoland, Barnsley in the early 1730s. Cockshutt was born in 1710. His father died when he was an infant and his mother was related by marriage to the Spencer family who formed the greater part of 'the Spencer Syndicate' a vast iron making concern operating across the north of England between 1660 and 1760. When John Cockshutt took on the lease at Ayton he was just beginning his career as an ironmaker but in 1739 he became a major player inheriting two forges and slitting and wire mills from his uncle Matthew Wilson at Wortley, near Sheffield, close to the family home.

The forges at both Ayton and Wortley did not smelt iron ore, they worked iron 'pigs' - the ingots produced by smelting iron ore. Pig iron is too brittle to use and it has to be melted again and worked to expel the remaining impurities from it, literally beating them out with a water powered hammer in a finery. Having been so worked, or "wrought", it was made into bars ready for transport. At Wortley the iron pigs were produced in local furnaces using the plentiful ore found in the Barnsley area. There are no such iron ore sources in the immediate area of Ayton Forge and the pig iron worked there was imported all the way from America as recorded in 1754 by a Swedish traveller and industrial spy, R. R. Angerstein (Berg 2001, 229-30). Angerstein noted that the forge had then been working for 24 years producing 150 tons of iron each year. He assessed the capability of the woods to provide sufficient fuel and noted the forge consisted of two finery hearths and a chafery hearth and that the ponds and forge were constructed of worked stone. Angerstein also noted that leather bellows were used to provide air to the forges and that these were mounted in the roof as protection from the heat. Angerstein does not give any detail of the dam or water wheel needed to power the hammers but an anonymous visitor in 1761 noted a 'fine waterfall' at the forge which might be a reference to the dam across the river though alternatively this might be a reference to the springs on the valley side (Anon 1761). The visitor goes on to state that the

fall of the water and the beating of the hammers in the forge 'gave one the idea of an earthquake by shaking the ground upon which I sat'.

John Cockshutt died in around 1765 and was succeeded in the business by his sons John and James. James Cockshutt was an innovator and took a scientific interest in ironmaking. He was a partner with Richard Crawshay "The Iron King" of the Cyfartha Iron works in South Wales. Crawshay and Cockshutt were responsible for introducing a new process of puddling and rolling which did away with the need for hammering. This change brought about the production of wrought iron on a large and economic scale. It was a change that effectively brought an end to iron working at Ayton Forge, although puddling was introduced at Wortley.

In 1787 the forge is described as a 'small iron foundry' and 'neglected' (Schofield 1787, 143) suggesting it had fallen on hard times. This is confirmed in more detail in letters describing the state of the forge in 1791 written by Robert Dunn to the new owner of the Seamer Estate, Joseph Dennison who had bought it from the Duke of Leeds the previous year (Dunn 1791). A descendent of John Cockshutt, Edward Cockshutt, tenanted the forge on a year by year basis without a formal lease. The buildings were in bad repair and not all the wheel-powered hammers were able to work. The impression is clearly that the forge had not been well-maintained and was struggling to make a profit. The two correspondents discussed changing the tenant from Edward Cockshutt to a Mr Binks though by 1798 the site was being run by Joseph Bland (Hinderwell 1798, 294). The 1791 letters give details of the dam connected with the forge describing the fall of water from the dam top to the bottom of the water wheel to be 9 foot 6 inches indicating quite a considerable structure. It is therefore regrettable that there is no indication of the position of the dam on the earliest known map to show the forge from 1796. The map surveyed by R. King is in the possession of Hutton Buscel Village Hall. It depicts the two townships of Hutton Buscel and West Ayton at around the time they were being enclosed (King 1796). Despite being part of East Ayton township and therefore on the opposite side of the river, the map depicts two buildings by the side of the Derwent labelled as 'Forge' and shows the loop of a water channel passing between them which is presumably the leat to power the water wheel (Figure 3). At almost exactly the same date a local artist, J. Hornsey, made a drawing of the forge which was then turned into an engraving published in 1798 (Figure 4) and is often found bound into copies of the first published history of Scarborough from that same year (Hinderwell 1798). It is difficult to know how much trust to put in the accuracy of the view as the jumble of buildings and chimneys is nothing like the 1796 map depiction or details shown on later Ordnance Survey



Figure 3. Redrawn extract from R. King's 1796 manuscript map showing the area of the forge.



Figure 4. The forge in 1798 from a drawing by J. Hornsey.



Figure 5. Lithograph of the forge from the south by Francis Nicholson published in 1822.

maps. Two years later the engineer William Chapman was commissioned to develop a scheme to alter the flow of the Derwent to alleviate flooding in the Vale of Pickering. His report stated that the mill at the forge and others along the Derwent would still receive the water they required to operate if some of the flow of the Derwent was taken away by an artificial channel to the north of Forge Valley - this is now the Scalby Sea Cut (Chapman 1800, 5-6).

3.3 After the forge

Activity at the forge seems to have ceased around the beginning of the 19th century and through the remainder of that century and into the next changes to the site are documented through the increasingly large number of views which appeared as the forge became a popular local attraction and from the large scale maps published by the Ordnance Survey.

Two early views from the 1820s show the site from different directions but are valuable as evidence for the appearance of the site soon after the forge had ceased working. The artist Francis Nicholson published a portfolio of six lithograph views of Scarborough in 1822 including one titled 'The Forge Valley' showing the site viewed from the south next to a cart track on the line of the modern road (Nicholson, 1822). Three buildings are shown in the middle distance (Figure 5). A two-storeyed building with a single chimney facing the viewer; a second building closer to the viewer on the right shown gable-end on and a third low building to the left of which only part of the roof is visible. A stream issuing from an arched culvert adjoins the cart track and passes in front of the viewer. The second is a pencil sketch from a book of drawings in a private collection made by Mary Frances Crompton of Esholt Hall near Bradford in the early 1820s (Figure 6). Labelled 'Forge Valley', the drawing shows a low building with a tree and stream in the foreground suggesting it was drawn from across the Derwent to the north of the site.



Figure 6. Sketch of the forge in the 1820s drawn by Mary Frances Crompton.

The first edition Ordnance Survey map at a scale of six inch to the mile (1:10560) published in 1854 (Ordnance Survey 1854) and the more detailed 25 inch to the mile map (1:2500) published in 1892 (Ordnance Survey 1892) (Figures 7 & 8) give an accurate picture of the layout of the site in the second half of the century and shows three buildings in the same location as indicated on the 1822 Nicholson engraving.



Figure 7. (left) The site depicted on the Ordnance Survey 1:10560 scale survey published in 1854 and Figure 8 (right) The site depicted on the Ordnance Survey 1:2500 scale survey published in 1892. Maps reproduced with permission of the National Library of Scotland.

- Building 1. (Forge Cottages). On the north of the site a terrace of buildings which became known as Forge Cottages, stood on the ridge of high ground. The 1892 map shows the terrace to comprise three properties which by that date were known as Forge Cottages. This is the two-storeyed building facing the viewer on the 1822 engraving.

There are numerous photographs surviving of the cottages (Figure 9) from which it is possible to discern that at some time the principal elevation of the building was either heavily lime-washed or lime rendered. At least one (possibly two) building ties are visible on some photographs at the gable end and other interruptions in the stonework suggest the building suffered some structural failure, possibly due to the proximity of the slope. In addition a section of the roof appears to have been repaired while one of the chimneys appears to interrupt the building in a way that it may be a later addition (S. Gandolfi pers. comm.).

- Building 2. On the west, there was a long narrow building aligned along the river. this is the building with only the roof showing on the 1822 engraving. This is also probably the long, low building viewed from across the river in the Crompton pencil sketch from the 1820s (Figure 6) and it appears on several late 19th and early 20th century photographs when it appears to have been used as stables (Figure 10).
- Building 3. On the south-east, next to the road there was a single building which was afterwards added to as both the 1912 and 1928 editions of the same map show further compartments to the west. This is the building shown gable end on on the 1822 lithograph.

Forge Cottages (Building 1) became a favourite stopping off place for refreshments in the later 19th century where 'they make tea, providing hot water, cream etc.' (Shaw 1874, 37). Visitors were attracted by the picturesque setting enhanced by gardens in front of the cottages, and by the stepping stones across the river later supplemented by a wooden bridge. From there they could walk a few hundred yards to view the petrifying springs on the



Figure 9. Forge Cottages (Building 1) viewed from across the Derwent in the early 20th century showing the stepping stones in the foreground.



Figure 10. Building 2 viewed from the north-east in the early 20th century.

west side of the valley, a site first noted at the end of the 18th century (Hinderwell 1798, 294). There are numerous different views of the cottages in local guidebooks and on postcards from the late 19th century onwards but Buildings 2 and 3 described above appear far less often in the views. It is not clear exactly when the cottages and the other buildings were demolished but they had all gone by the early 1950s (Ordnance Survey 1953).

4. The 2019 Survey (Figure 11)

The majority of the earthworks and lengths of wall foundation recorded by the 2019 survey clearly relate to buildings and other features shown on the 1892 map.

The north-west corner of Building 1 (Forge Cottages) is visible as brick foundations on the ridge of high ground at the north limit of the survey area. A short distance away to the south there is a much more obvious base of an angled stone wall that is part of a garden boundary wall next to the cottages first depicted on the 1912 Ordnance Survey map (Wall 1). On the north this length of walling continues as a terrace cut into the hill side which may be a further element of the early 20th century garden arrangement. To the west, below the terrace is one short length of brick foundation (Wall 2) which matches a small square building shown on the 1892, 1912 and 1928 Ordnance Survey maps. It was possibly an outdoor toilet which discharged directly into the river.

The row of cottages continued on the east as far as a terracing wall on top of which the road passed almost level with the roofline as is evident from photographs. Following demolition the slope, up to the road was graded burying in the process the east end of the cottages and perhaps in the process aiding the survival of structural remains.

The flat top of the ridge in front of the cottages and the slope beyond down to the valley floor was laid out as gardens of which no earthwork evidence remains apart from fragments of a path (possibly a flight of steps) on the south side of the ridge which is shown on the 1892 Ordnance Survey map and its later editions. The feature was too fragmentary and overgrown to be recorded during the 2019 survey. A short length of stone wall (Wall 3) was recorded towards the foot of the ridge marking the boundary of the garden shown on the 1892 Ordnance Survey map and on contemporary postcards.

At the foot of the ridge, a large part of the picnic area was taken up by what appears to be a pond from its blue colouring on the 1892 map - though it is possible that this is a mistake by the colourist. Later editions show what is probably a garden in the same area with what might be a much smaller, oval shaped pond within it. Further back in time though, the 1854 map shows a linear pond angled from north-east to south-west seemingly fed by a channel at its south end emanating in a group of springs on the valley side immediately above and culverted under the road. Curiously the map does not show an outlet from the pond but the 2019 survey recorded a narrow channel cut into the bank on broadly the same alignment as the long, narrow pond shown on the 1854 map. The channel could be connected with the 1854 pond and indicate the point where it drained into the river.

There is no trace of any pond or channel surviving within the picnic area but a core taken as part of the 2019 survey work close to the northern edge of the 1892 pond recorded a sequence of infill deposits to a depth of 2.7m (Appendix 1). The lowest deposit consisted of partially burnt wood above a hard impenetrable layer that may be bedrock. Clearly there is a complex history of deposition in this area to account for the depth of build-up of which the features depicted on Ordnance Survey mapping described above represent the most recent phases.

Along the river bank to the west of the picnic area the survey recorded a 10m length of wall foundations which included sections of both brick and stone construction. This feature is on the line of the west exterior wall of the long, narrow building shown first on the 1854 map (Building 2) aligned along the edge of the river. Judging from the 1892 map, the building was

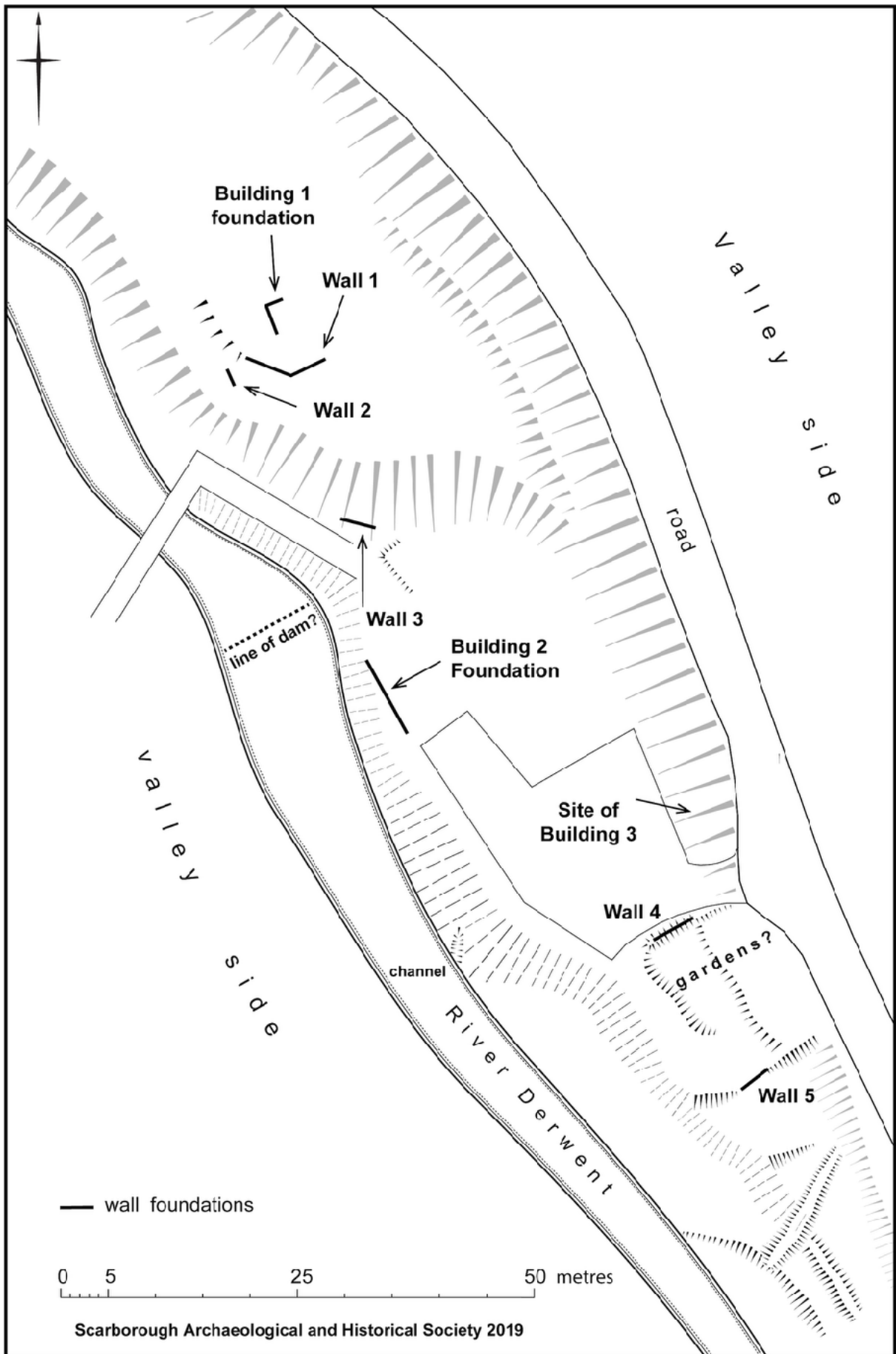


Figure 11. The 2019 archaeological survey plan showing features mentioned in the text.

increased in length to the south after 1854 so the building remains probably extend for another 15m beyond the south end of the visible wall foundations and for about 2m further to the north. The interior of the building and the east exterior wall could well survive below the car park. A change in the masonry visible on a photograph of the building from around the end of the 19th century supports the idea that it was constructed in two phases and interestingly, the exterior wall of the older north end had partially collapsed by that date (Figure 12).



Figure 12. View of Building 2 from the north-west across the Derwent in the late 19th century.

The third building (Building 3) shown on historic Ordnance Survey maps next to the road on the south-east of the site has left no surface traces. The building stood just to the north of the entrance to the car park and remains of it may be preserved beneath the graded slope that falls from the road edge down to the car park. As the map evidence indicates, this building was extended westwards after 1892 and there may be traces surviving below the car park.

In the wooded area to the south of the car park the survey recorded the earthwork boundaries of two adjacent rectilinear plots of ground defined by single scarps with a bank, possibly a wall on the north close to the edge of the car park (Wall 4) and a single scarp on the south incorporating a further short length of walling (Wall 5). The plots picked out by the earthworks and lengths of wall are clearly depicted on Ordnance Survey mapping as far back as 1854 and were presumably two small gardens.

A bank aligned north-east to south-west at the south limit of the survey area probably indicates the line of a buried drain taking the outflow from the 'Old Man's Mouth' spring across the valley floor to the river. On the south side of this drain alignment, the survey noted the start of a slight bank heading south down the valley and continuing outside the survey area.

As part of the survey the river was examined for possible traces of the dam mentioned in the 1791 correspondence which would have been needed to manage the flow of water to power the water wheel at the forge. Though no definite traces of a dam survive, a distinct line of boulders across the stream bed 10m downstream of the footbridge could be a clue to its position (Figure 13). These served as stepping stones in the 19th century until the construction of the forerunner of the present footbridge. Alternatively, the dam could have been further upstream, perhaps at the foot of the ridge where the valley bottom is naturally narrower and so would make constructing a dam slightly easier.



Figure 13. View across the Derwent towards the forge site showing the line of boulders in the river bed.

5. Summary of understanding (Figure 14)

Ayton forge tells the story of iron making in England in the 18th century, a crucial period that would lead to huge advances in the manufacture of iron and ultimately to the Industrial Revolution itself. The Cockshutt's were iron men through and through, innovators and businessmen operating on a local, regional, national and international scale. The significance of the 60 years the forge operated under the Cockshutts' cannot be underestimated and makes this a very significant site indeed.

The 2019 survey has demonstrated that traces of the buildings and other features shown on Ordnance Survey maps as far back as 1854 are visible on the site and that more extensive remains may survive, particularly below the car park and the graded slope on the east up to the road. The Nicholson engraving and the Crompton sketch indicate that these buildings were there in the 1820s and therefore may well have been part of the forge, if only in its final years. What functions these buildings had though is entirely speculative. It is probable that

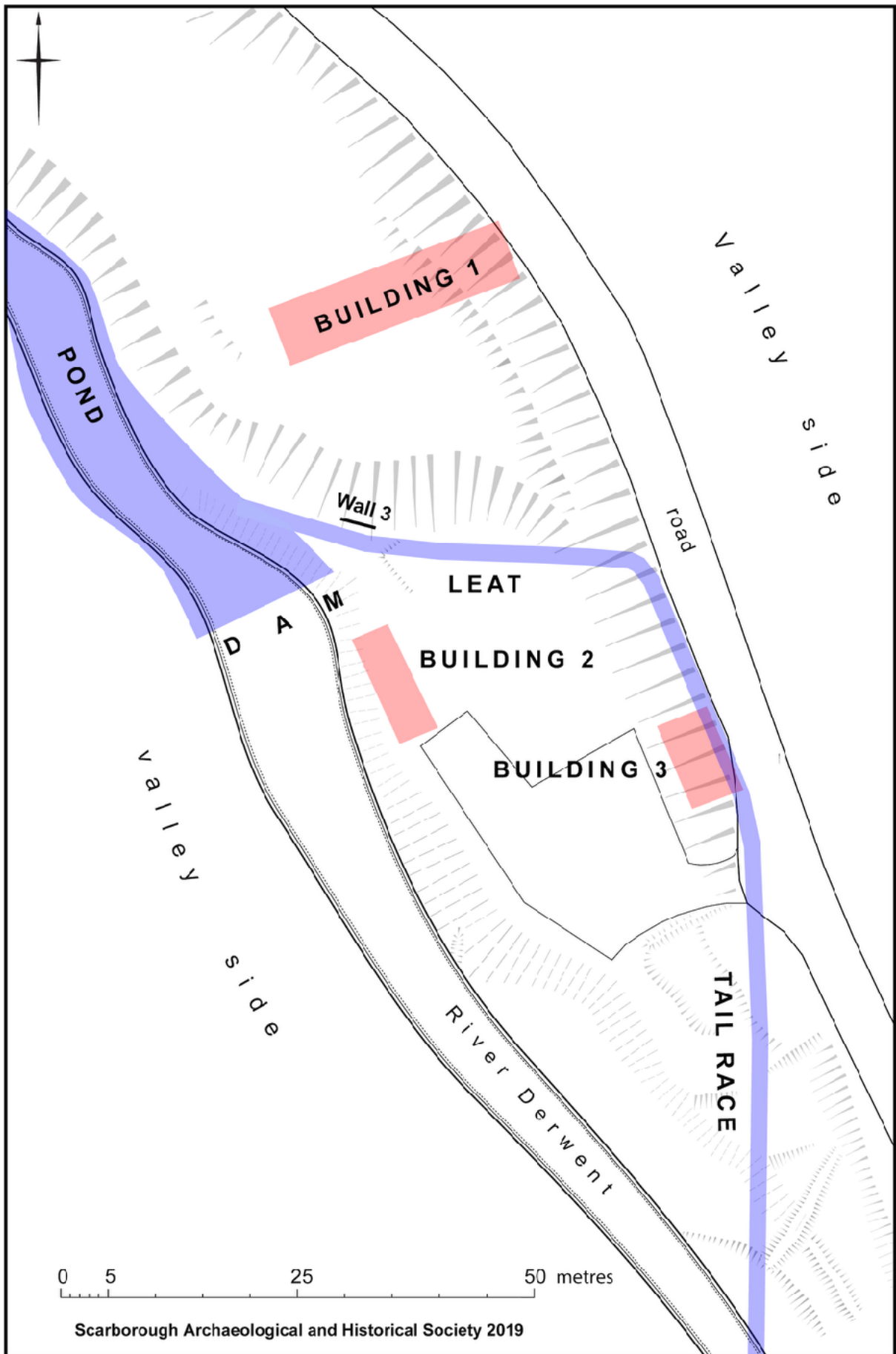


Figure 14. Conjectured layout of the forge based on the 2019 archaeological survey.

Building 1 (Forge Cottages) was housing for the forge workers and others employed on the Duke of Leed's Seamer estate. Building 2 next to the river was maybe used for charcoal storage and stabling. Despite its proximity to the river, there is no indication on the 1820s Crompton sketch or the late 19th century photograph (Figure 12) that it was the site of the water wheel as it presents a blank wall to the river. Consequently the most likely candidate to be the forge building is Building 3 - the gable-ended building shown on Nicholson's 1822 engraving at the south-east corner of the site. The engraving shows what may well be the tail race issuing from an arched masonry culvert on the the south side of the building which is good evidence that it was the site of the water wheel and presumably also of the wheel-powered hammers.

Other details of the forge layout are less clear. The course of the leat to the suggested site of the water wheel and its route from there back to the river have left no visible traces and nothing was mapped by the Ordnance Survey. One reason for this could be that the leat was carried above ground in a timber 'launder' leaving far less behind than if it had been a dug channel. The best evidence we have available is therefore King's 1796 map which shows the leat and two buildings. Despite the lack of detail the map can be matched to what we know about the layout of the site. On the north of the forge the map shows a long rectangular building aligned east-west which from its position and orientation is almost certainly Building 1 (Forge Cottages) on the ridge top. The map then shows that the leat left the river almost at right angles and initially on a straight line to the south of the building. Looked at on the ground, this evidence indicates that the leat left the river somewhere just upstream of where the line of boulders in the river indicate the possible line of the dam to run eastwards in a straight line along the bottom of the ridge, along what is now the north edge of the picnic area. By holding back the river, the dam would have created a large pond upstream whose extent is still to be determined. Wall 3 is very close to where the leat may have passed after leaving the pond and so might be a surviving section which later served as a garden boundary wall as described earlier.

The 1796 map suggests that after passing along the bottom of the ridge, the leat took a sharp turn to the south somewhere roughly to the east of the picnic area and that there was a building in the angle of the turn. Taking the map at face value this would mean there is a building somewhere below the north-east corner of the picnic area. With its proximity to the leat the building on the map is a strong candidate to have been the site of the water wheel and forge. However, it is possible that the map is not entirely accurate and that the building shown on the 1796 map was not exactly in the angle of the turn but is infact Building 3 slightly further south and known from the 1822 lithograph to have been next to the tail race. From this point the 1796 map indicates the tail race returned to the river, taking an oblique course across the valley floor through the wooded area to the south of the car park where all that is visible now are the earthworks of two small garden plots.

The survey and associated research has so far not found any conclusive evidence of iron working on the site before the 18th century though the presence of an earlier forge could be one explanation of why this location was chosen. Other reasons include ample supplies of charcoal from the nearby woods and a copious and constant water supply from the Derwent, and perhaps also the springs on the adjacent valley side. Angerstein reported that the forge was using imported pig iron in the 1750s but it is possible that at other periods it worked as a bloomery to process iron quarried locally. However, none of the various quarries in Forge Valley sampled as part of this project appear to posses iron-rich strata (Appendix 2).

6. Conclusions

The 2019 survey noted wall foundations in several parts of the site which is a good indication that more extensive remains probably survive below ground including features belonging to the 18th century forge. Any future plans for the site should pay close regard to preserving the wall foundations visible on the surface and consider the much greater archaeological potential of the buried remains, made all the more important because of the seeming paucity of historical evidence for the forge. This report has suggested the possible layout of the forge including the likely locations of the dam, the leat and the forge building.

It is difficult to explain the 2.8m depth of deposit revealed by the core in the north-east corner of the picnic area (Appendix 1). It is possible that there is a deeply-cut feature here connected with the forge, or some of the depth may be due to natural build-up of deposits in the valley bottom over many hundreds if not thousands of years. A more extensive programme of coring, with laboratory analysis of the resulting samples to obtain dating and environmental evidence could produce important information about the history of the site in the 18th century and before.

More light could be shed on the operation of the forge from scientific analysis of slag samples recovered from the site. Various pieces of slag were noted during the course of the survey predominantly along the river edge and a programme of systematic collection and analysis of slag samples could provide information on the various working methods used at the forge in the 18th century and might be a way of identifying earlier iron working on the site, such as in the medieval period.

This report has not discussed the importance of the forge in the industrial revolution in the north of England but on-going documentary research by the SAHS indicates that through the links with the Cockshutt family, the site was of more than local significance in the development of iron working technology during the 18th century. This highlights the need to seek to preserve the site for the future and also the site's potential to add to the 'visitor experience' by explaining the background to how the valley got its name.

7. Acknowledgements

The Raincliffe Woods Community Enterprise are thanked for their support and for giving permission to undertake the survey. Natural England are also thanked for allowing the work to take place in the Raincliffe and Forge Valley Woods SSSI. The staff at Sheffield Archives, the East Riding Archives in Beverley and the Brotherton Library in Leeds are thanked for their help in providing documents. Chris Wilson of Thorn Park Farm is thanked for sharing his extensive knowledge of the site and of the Forge Valley area. The work was undertaken by the following members of the Scarborough Archaeological and Historical Society: Martin and Jan Bland, Gareth Davis, John Dean, Mark Franklin, Stephen Gandolfi, Chris Hall, Sue Ogilvy, Trevor Pearson and Marie Woods who all contributed ideas and observations that appear in this report. Marcus Jecock from Historic England made useful observations on his visit to the site and Professor Peter Rawson arranged for Hull University Department of Geology to analyse rock samples from local quarries to test their iron content (Appendix 2). The report was written by Trevor Pearson and Martin Bland and edited by Chris Hall.

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9. Appendices

Appendix 1 Report on the soil core (John Dean)

The Forge, 28th April 2019: soil analysis

Location A	
Topsoil	
10cm	
Back-fill yellow clay with gleying	
60cm	free water
Industrial, soft clay silt	150-260 μ CGS
Very high anthropogenic carbon content, ferrous salts leaching into the clay giving it a grey-green colour	
Small amounts of magnetic material, possibly hammer scale	
Small amounts of lime with very small inclusions, some of which might be coal	
200cm	piece of window glass [see small finds report]
Large amounts of partially burnt wood	
270cm	impenetrable hard layer

Notes:

- In each box the cm figure is the depth of the soil horizon at the bottom of each individual sample.
- Magnetic susceptibility is expressed in red using the convention for absolute *mass* values.
- The ground level at Location A is 39.45m OD.
- Thus the lowest point in the sampling column is 36.65m OD [39.45m – 2.7m].
- The river bed as measured in the vicinity of the Temporary Bench Mark is 36.79m OD.
- Thus the lowest point in the sampling column is 14cm *below* the river bed in the vicinity of the Temporary Bench Mark [36.79m – 36.65m].

Appendix 2

Analysis of iron content from local quarries (Prof. Peter Rawson/Hull University)

READING NO.	SAMPLE NO.	APPROX. % Fe	LOCATION
2105	1	0.4	SE 98305 87602
2106	2	1.0	SE 98357 87639
2107	3	1.8	SE 98565 87550
2108	4.N	1.1	Whetstone Quarry - north
2109	4.S	1.4	Whetstone Quarry - south
2110	4.S	0.5	Whetstone Quarry - south
2111	5	1.4	SE 98640 87070
2112	6	0.5	SE 98384 87485
2113	7	2.7 (clay-covered)	Forge Quarry
2114	8	2.2	Forge Quarry
2115	9	1.2	SE 98358689
2116	10 small	4.0	Wallis Quarry
2117	10 medium	3.3	Wallis Quarry
2119	10 large	2.9	Wallis Quarry
2120	11	0.5	White Quarry
2121	12	0.45	Sievegate Gill

SAHS RECENT FIELD WORK REPORTS

Interim 37	An archaeological evaluation at the lounge site, Harcourt Place	2004
Interim 38	An archaeological evaluation excavation at the site of the former 23 Quay Street, Scarborough	2006
Interim 39	An archaeological excavation at Auborough Street, Scarborough	2010
Report 40	Investigation of a pre-historic square enclosure at Racecourse Road, Seamer Moor	January 2013
Report 41	An archaeological excavation at 34 Queen St, Scarborough	January 2013
Report 42	Archaeological Investigation into a Linear Earthwork at Seamer Moor, Scarborough	January 2013
Report 43	Archaeological excavations at 60-62 Quay St, Scarborough	Forthcoming
Report 44	Archaeological investigations on land at Raven Hall Rd, Ravenscar, North Yorkshire	March 2014
Report 45	Archaeological investigations at Ayton Castle, West Ayton, North Yorkshire	September 2013
Report 46	An earthwork survey of Castle Hill, Brompton	October 2016
Report 47	Raincliffe Woods Archaeological Survey: December 2015 - April 2016	October 2016
Report 48	An excavation at Castle Hill House, Brompton	February 2018
Report 49	An Archaeological Survey of Forge Valley, Raincliffe and Row Brow Woods, Scarborough, North Yorkshire	March 2018
Report 50	An Excavation at Castle Hill, Brompton	December 2018
Report 51	A Survey of the forge, Forge Valley, Scarborough	June 2019