

Recent excavations

Foxbrook Furnace, Derbyshire

Paul Belford

Between 1996 and 1998 the Archaeological Research and Consultancy at the University of Sheffield (ARCUS) undertook a series of excavations on the site of a 17th-century blast furnace and later grinding wheel at Renishaw, Derbyshire (NGR SK 4283 7725). The work was directed by the author, and was a condition of planning permission which was granted to H J Banks and Co for opencast coal extraction. Post-excavation analysis is ongoing, and a more detailed account of the site will be published in due course.

The opencasting area forms part of the Sitwell estate, and it was George Sitwell who began to exploit the coal-measures ironstone in the 17th century. By 1652 the Foxbrook Furnace was in operation, smelting ore from the surrounding area (Riden 1985, 273-4). Documentary

evidence for this was supported by field observations during opencasting; over 300 'bell-pits' were located in the fields adjoining the south-western side of the site. The Sitwells ran the furnace until the 1690s; by 1707 it had become part of the Spencer ironmaking combine. At its peak the furnace was producing 350 tons of pig-iron a year, but this declined in the 18th century and by 1747 the furnace was 'ruinous' (*ibid*, xxxiii). The site was subsequently modified for sickle grinding, which continued until the 1830s (Hopkinson 1961, 133).

Archaeological excavation revealed evidence for both phases of site use (Fig 1). Water entered at the southern end of the site and was fed into a small impounding reservoir, originally with clay banks, but remodelled in the 18th century with stone revetment walls. The water wheel, tailrace and working area were located in a large artificially created depression to the north of the pond, with over five metres head of water. The wheelpit was originally 0.8m

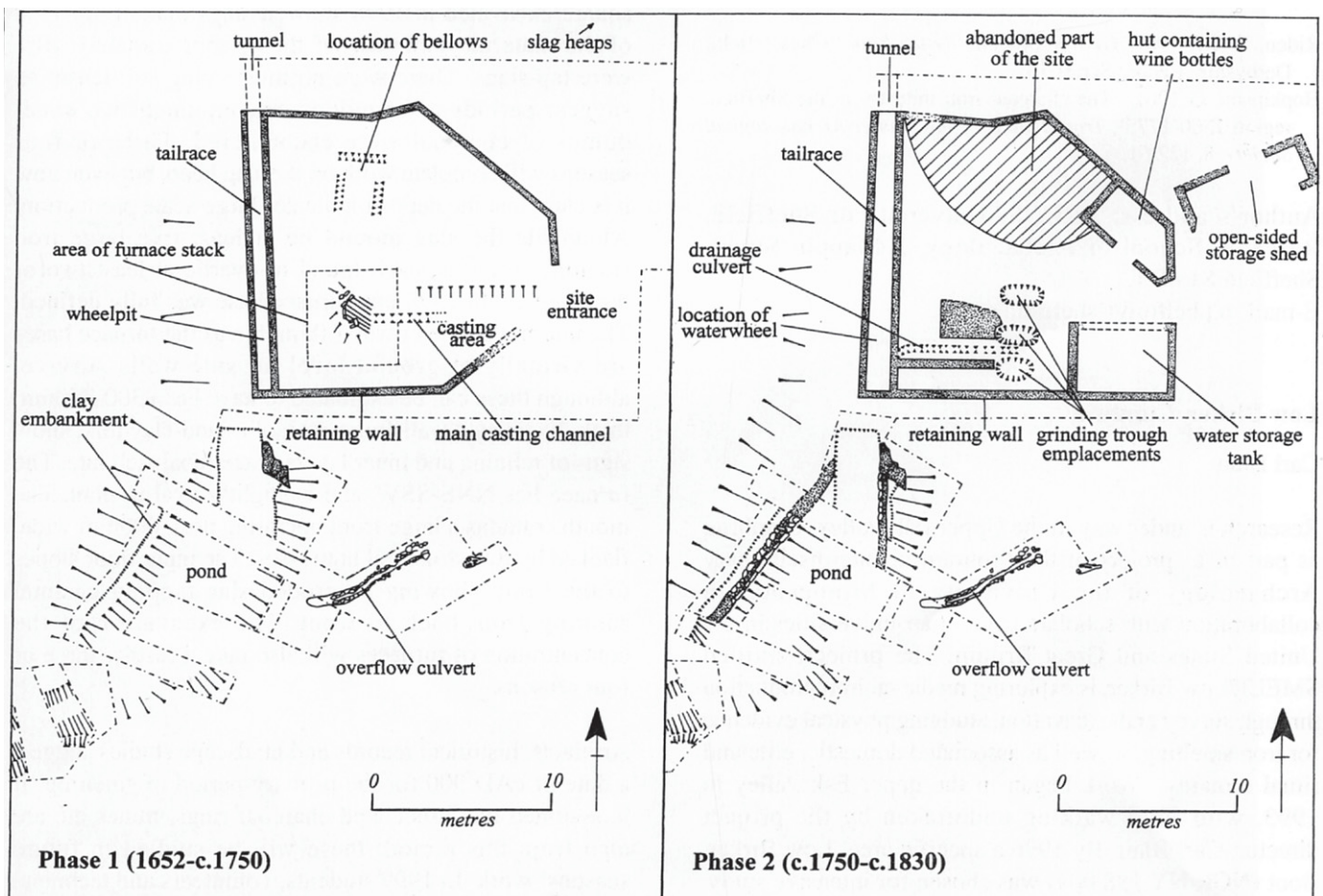


Figure 1: The excavations at Foxbrook Furnace

wide, with dry-built sandstone walls and a stone-flagged floor. It was rebuilt in the 18th century to make it wider and shallower. Remains of the later water wheel were found where it had collapsed after final abandonment of the site.

The furnace structure had been severely truncated by the sickle works. Only the drainage channels beneath the hearth survived intact. They were set in a triangular arrangement and were overlain by debris from the hearth bottom. The furnace was adjacent to the wheel and would have been charged from the level of the pond. The location of the bellows was therefore to the north of the furnace, indicated by beam slots cut into the underlying clay. The casting area was defined by an area of fine sand to the east of the furnace which contained various channels and depressions. There was no casting pit, but putative fragments of moulds were found in the casting area. The later sickle works comprised three large pits for grinding troughs; these had been cut through the eastern side of the furnace. The grinding wheels were belt-driven. Two sheds, a drain, and a stone-lined water tank were also constructed. One of the sheds contained large quantities of 18th and 19th-century bottle sherds and clay tobacco pipes.

References

- Riden, P (ed) 1985, *George Sitwell's letter book* (Chesterfield: Derbyshire Record Series 10).
 Hopkinson, G 1961, 'The charcoal iron industry in the Sheffield region 1500-1775', *Transactions of the Hunter Archaeological Society*, 8, 122-51.

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Low Birker, Cumbria

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Research is under way in the Upper Esk Valley, Cumbria, as part of a project of the Program in Interdisciplinary Archaeology of the University of Minnesota, in collaboration with scholars from other universities in the United States and Great Britain. The project, entitled SMELT/Low Birker, is exploring medieval iron production through survey and excavation, studying physical evidence for iron smelting, as well as associated domestic, elite and ritual remains. Work began in the upper Esk valley in 1993, with field walking undertaken by the project director, Carl Blair. By 1996 a specific area, Low Birker, Boot (NGR NY 188 004) was chosen for intensive study. In 1997 a trial season of survey and excavation took place, followed in 1998 by the first of a series of annual six-week

seasons.

The project has three goals. Firstly, to study early large-scale iron production, the focus of the SMELT project since 1988, secondly, to study medieval iron production in its rural context, and, finally, to engage public interest through educational outreach. The Low Birker site is well suited for each aim. It lies on a north-facing slope overlooking the Esk flood plain. Estate records show that for the past 600 years the area has been managed as woodland; hence the site and its vicinity have never been ploughed. The present vegetation is a mix of open deciduous woods and rough grass/bracken pasture. On and immediately below the present ground surface are extensive archaeological remains. Within 300m of the primary study area, field walking and shovel testing have located slag heaps, iron smelting furnaces, mine-pits, charcoal burning rings, dams, hut platforms, and possible cart and packhorse tracks, some obscured by later activity. The density and preservation of features is impressive: it is possible to locate hut-doorways, as one or two lower courses of stone often survive.

In the 1997 and 1998 seasons, work has been concentrated on a slag heap and iron smelting complex. The area of the slag mound is 100m². Test pits in 1997 and a four metre-square excavated in 1998 showed slags making up 75% of the material removed. Of these, approximately 40% were tap-slugs. There were no intervening soil-lenses to suggest periods of abandonment, although two small dumps of charcoal were encountered. Three or four seasons will complete work on the slag heap, but even now it is clear that the deposit indicates large-scale production. Alongside the slag mound lie at least five large iron smelting furnaces, each found to overlie at least two or three others. In 1998 one furnace base was fully defined. The internal diameter was 1.05m, but as the furnace bases are virtually at ground level no side-walls survive, although these can be estimated to have been 300-350mm thick. Excavated wall-fragments, of a sand-clay mix, show signs of relining and inner layers of charcoal-rich lute. The furnace lies NNE-SSW, and is slightly oval in plan. The mouth contains a large front operating port, 600mm wide, flanked by two structural buttresses. The inner floor slopes to the front, showing an eroded slag-tapping channel running from back to front. The excavation of the concentration of furnaces will also take a further three or four seasons.

Artefacts, historical records and landscape studies suggest a date of cAD 900 for the primary period of smelting. It is assumed that associated charcoal rings, mines etc are also from this period: these will be studied in future seasons' work. In 1999 students, volunteers and technical specialists will join archaeologists from the United States, Britain and Slovenia. Further participants will be most

welcome, and enquiries should be made to the author.

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