

9. THE SLAG AND INDUSTRIAL MATERIALS

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The evidence presented by the slag and industrial materials recovered from Craggan, suggests that both ferrous metal smelting and blacksmithing were taking place on-site during both the Middle Iron Age and early medieval periods, with the remains of in situ smelting furnaces also identified. The vast majority of the diagnostic metalworking residues identified (93.3%) were retrieved in association with three separate truncated features or feature groups, including the remains of two in situ smelting furnaces [124] (14.2%) and [337] (7.1%), and a large dump of metalworking waste or possible cleared-out smelting furnace feature group [170] (71.9%). A total of 6.3% of the diagnostic materials were retrieved in association with two intercutting discrete dumps containing evidence for both smelting and smithing, [202] and [311], while the remainder of the materials were recovered as residual finds later incorporated within various pit, ditch, and posthole fills across the site.

In situ evidence for smelting during the Middle Iron Age was identified to the immediate northeast of Structure E, with the dating of hazel from the smelting furnace remains [124], while another likely in situ smelting furnace [337] to the east of Structure D has been dated to the early medieval period. The large metalworking waste deposit or possible cleared-out smelting furnace [170], which also produced some evidence of smithing activity, was dated to the early medieval period. The intercutting, isolated dump deposits containing evidence for both smithing and smelting were also dated to the early medieval period.

This evidence demonstrates two distinct phases of smelting and likely smithing activities taking place on site during the Middle Iron Age and the early medieval period through the identification of in situ smelting furnaces [124], [337] and a possible cleared-out furnace and large dump of material [170], [202], and [311]. There is a distinct shift in smelting technology between the Middle Iron Age and early medieval features, with quantities of tapped slag present only within the early medieval furnace [337], the possible cleared out furnace [170], and the discrete dump [202], all of which

date from between the 8th and early 11th centuries AD. Tapped furnaces, which allowed the molten slag to flow from the chamber, came into use during the Late Iron Age, Iron Age, and were also in use during the early medieval period and beyond (Tylecote 1986: 156).

Although it is not possible to determine the frequency, intensity, or scale of iron production taking place on site, or the amount of bloom, billet, or iron objects that were being produced or repaired, the diagnostic metalworking evidence identified (in both feature and recovered waste) is suggestive of small-scale smelting taking place during the Middle Iron Age, perhaps even a single episode, with more comprehensive metalworking activities taking place during the early medieval period, though still reflective of smaller-scale production. The evidence for metalworking on site is limited by the degree of truncation present, with only the bases of the pits of the possible furnaces surviving, and no in situ smithing hearths identified, allowing for the possibility that additional smithing and smelting features may once have been present and in use. It is possible that the smithing evidence identified may relate to the primary smithing of the blooms from smelting, rather than blacksmithing activities taking place within a smithing hearth, which could partially explain the absence of smithing hearths present on site.

The site does, however, add to the corpus of knowledge of iron production taking place in the Highlands of Scotland, near Inverness and the Moray Firth during the Middle Iron Age and early medieval periods. The most significant Iron Age ironworking site in the area, and indeed Scotland, is the site at Culduthel Mains Farm, south of Inverness and northwest of Craggan, which was a large-scale purpose-built Iron Age craftworking centre, producing evidence for iron smelting and smithing, as well as non-ferrous metal and glass production from the mid-4th century BC to the mid-4th century AD (Hatherley & Murray 2021: 31). A considerable number of smelting furnaces were uncovered which survived largely intact, and so well-preserved that many retained their final smelt still in situ, which can provide important insight into what the furnaces at Craggan may have originally looked like. The Craggan smelting furnaces, in comparison, survive only as the truncated bases of the furnace pits with

scraped-out hollows that the slag would have been raked into, in front of where the furnace once stood. Therefore, the evidence at Craggan is indicative of a non-specialist settlement site. Other nearby similar Iron Age ironworking sites include Seafeld West, near Inverness, which produced evidence for in situ smithing activity (Heald et al 2011: 20), as well as smelting furnaces at Tarras and Grantown Road, and also Birnie, near Elgin, which produced over 210kg of ferrous metalworking waste representing the remains of both smithing and smelting activities (Dungworth & McLaren 2021: 166–7).

Evidence for ironworking during the early medieval period exists on a range of site types in Scotland including nuclear forts, duns, open settlements, crannogs, and monastic sites (Heald & McLaren 2008: 206). The monastic site of Inchmarnock produced rare and important evidence for in situ ironworking during the early medieval period (*ibid*), while the open settlement site of Lair, in Glen Shee, produced a considerable amount of material associated with both smithing and smelting activities (McLaren 2019). Good evidence

for ironworking within nuclear fort sites has been identified at sites like King's Seat, near Dunkeld (Morrison Forthcoming), and further afield at Dunadd, in Argyll and Bute (McDonnell 2000), and the Mote of Mark, in Dumfries and Galloway (Crew 2006), amongst others.

The range and scale of ironworking activities taking place at Craggan during the Middle Iron Age and early medieval periods is difficult to quantify due to the pronounced truncation of features across the site, which includes the remains of smelting furnaces, and may also explain the lack of blacksmithing hearths identified, though the presence of smithing waste may be the result of the initial smithing of the bloom following the smelt. It is entirely possible that the scale of ironworking activity on site during both the Middle Iron Age and early medieval periods may be more extensive than the surviving evidence attests. Despite this, the Craggan assemblage is considered to be a valuable addition to the growing corpus of well-dated, well-stratified metalworking evidence from the northeast mainland of Scotland.