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8. NATIVE or ROMAN?
Ironwork Hoards in Northern Britain

by A. R. J. Hutcheson

Introduction

The aim of this paper and the research that preceded it was to assess if ironwork found in native contexts in the north of Britain during the Roman period is of native or Roman manufacture. An approach examining the smithing technologies was adopted, where the metallographic structure was scrutinised for differences in objects from Roman military sites. These objects were then compared to material from the locality. Iron objects from four sites in the region were studied: Newstead – Antonine Fort, Traprain Law – Iron Age/Roman Period Hill Fort, Carlingwark Loch – Metalwork Hoard and Blackburn Mill – Metalwork Hoard (see figure 1)

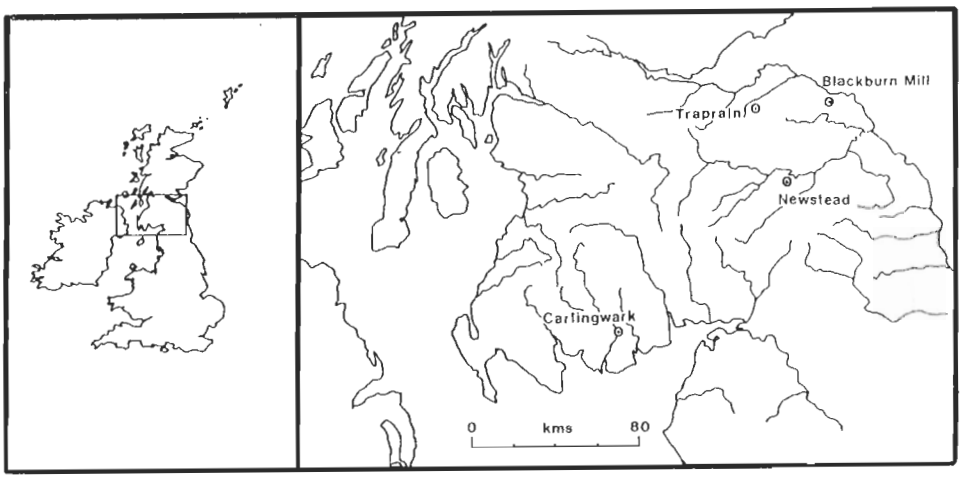

Figure 1. Location of sites

Current Interpretations

Piggott in his essay on the three big ironwork hoards from Northern Britain (Carlingwark Loch, Blackburn Mill and Eckford) dates them to the Roman period, and suggests that they consist of a mixture of Roman and native artefacts (Piggott 1953). He further classified some of the material into a third typological category – 'Belgic'. The latter is a category that has not survived well in the intervening years, particularly if viewed from a literal interpretation implying Belgic invasion and migration through England, into the Scottish borders. However, if removed from the culture historical paradigm, what Piggott was seeing stylistically can still be described as Late La Tène. Essentially Piggott's categories hold true today, although the reasons for the distinct styles all being present in the same deposits are open to debate.

Manning constructs a different and more extreme case for the stylistic and manufacturing origin of the ironwork in these hoards (1972, 1981). He suggests that Piggott's native/Roman division is erroneous and that the hoards of ironwork are in fact, "a phenomenon connected with the Roman army, probably linked with Celtic auxiliaries from Southern Britain or the Continent" (Manning, 1981:57). Manning bolsters this argument by noting an absence of ironwork from excavations of northern settlements in the Roman period, "if these hoards are removed from the native Scottish sphere it effectively disposes of large groups of allegedly native ironwork (except that from Traprain Law)" (Manning 1981:57).

The implication behind this statement is that the natives of northern Britain were at this time incapable of significant production of iron and therefore any found in the vicinity must be the manufacture of more sophisticated continental or southern British producers. The three hoards are therefore not, in any fraction of their make-up, native according to Manning, but are imports either brought in or manufactured by the Roman army. This assertion acted as the impetus and starting point for a technological study of material from both the Roman and native cultural continuums within the borders region of Scotland.

In order to determine whether there was a native ironworking tradition and technology a study from a metallographic perspective was initiated (for further information see Scott 1991). Artefacts from two of the hoards, Carlingwark Loch and Blackburn Mill, along with material from the hillfort at Traprain Law, which were known to have been occupied in the Roman period by natives with access to Roman consumer goods, were compared with objects of known Roman army provenance from the Antonine Fort at Newstead. Knives were chosen as the best artefact type for comparison as they are both relatively common and require a fine degree of metalworking skill in order to produce an effective tool.

The Sites

The iron objects from Newstead examined in this study came from a series of 107 deep pits found within the fort during excavations conducted by James Curle at the beginning of this century (Curle 1911). These pits contained a vast array of material which survived in immaculate condition due to the anaerobic environment within the pits. The ironwork assemblage is one of the largest single collections of Roman iron in Europe. Three hundred and forty-three iron artefacts were discovered in total, most were complete and uncorroded. All the material dates from the late first or early second century AD.

The Carlingwark Loch hoard was dredged up by fishermen in 1866. All the objects were contained in a large bronze cauldron. Although the original provenance for this material is impossible to pinpoint, the presence of a crannog or lake dwelling present on the Loch is compelling.

The Blackburn Mill hoard was uncovered in 1852 by workmen cutting a drainage ditch through a peat formation. The sixty-five objects were contained within two bronze cauldrons one upside down on top of the other. Piggott (1953) suggests that the area may once have been a lake but the positioning of the cauldrons makes this possibility unlikely, it is more plausible that the area was marsh land and that the hoards were effectively deposited just below the surface.

Traprain Law is a hillfort thirty kilometres north-east of Newstead and known to have been occupied at the same time as the fort. The site was excavated between 1914 and 1924 by Alexander Curle, James Curle's brother. A great array of material was collected during these excavations, in particular, large amounts of Roman material was recovered, including an impressive number of coins. Sekulla's investigation of the coins showed that the site was the focus of widespread trade and that the coins fall into two date groups AD 78–160 and AD 250–400 (Sekulla 1982), the first of these periods coincides with the occupation of Newstead. The excavated material is impressive in both quality and quantity, leading to recent arguments on the nature of the occupation, which due to the lack of recorded contextual information, is difficult to resolve. Burley's 1956 study of the metalwork from Traprain suggested that the knives are not typologically Roman, but can be paralleled with examples found at Broch sites much further to the north and west.

Comparison of Ironsmithing Technology

It was necessary that objects of similar function were compared to assess the respective smithing technology. Blades, mainly knives, but including swords and razors, were chosen because they were common in both Roman and native contexts and they require specific smithing techniques. These objects were analysed using X-radiography and metallographic examination.

Fifty-three objects were radiographed at varying kilovolt potentials and exposure times in an empirical attempt to glean the maximum amount of information for each piece. The results of this exercise were ambiguous, but showed pattern welding on one of the native razors from Carlingwark Loch and a number of the Newstead knives. In addition, information from the radiographs was useful in making metallographic sampling decisions. The metallographic analysis consisted of removing a sample from the object, grinding under controlled conditions, etching with nital – a weak acid solution – and observing the microstructure under an optical microscope. The resultant microstructure or metallographic structure is a product of the history of heating, cooling, annealing and welding, not necessarily in that order.

Fifteen objects were analysed metallographically: six from Newstead, two from Traprain Law, four from Carlingwark Loch and one from Blackburn Mill (see figures 2 and 3). The study suggested that blades from Newstead differed from the knives from all the other sites in a number of ways:

1) Slag inclusions were less numerous.

2) Lines of slag stringers, indicative of the direction of working during smithing, had their axes aligned towards the cutting edge.

3) Slag stringers showed little remnant alignment. This was more common in the material from the other sites, particularly an unfinished piece from Blackburn Mill. There are a two likely reasons for these differences:

   a) Roman pieces may have been hot worked to a greater extent during the final smithing stage.
   b) Roman iron was more malleable, possibly because of the use of different ore sources, particularly ones which did not contain significant quantities of phosphorus.

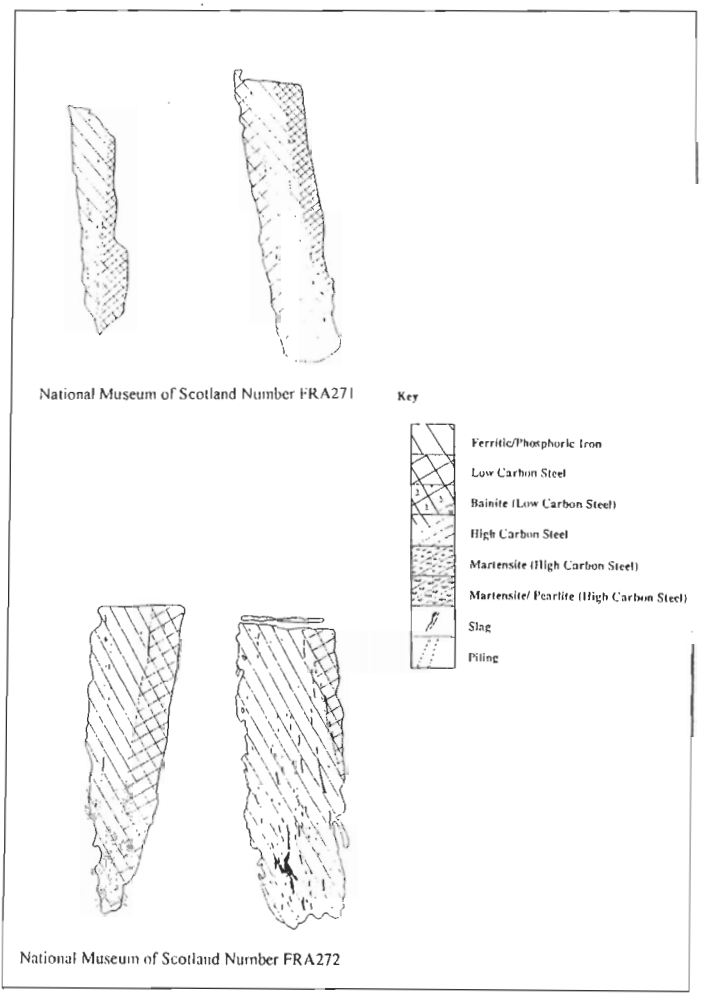

Figure 2 Examples of two composite constructed knives from Newstead

4) There are examples in both the native and Roman material of multi-phase slags, indicative – by more recent standards – of an inefficient smelting technique. However, only one of the Newstead knives exhibited this attribute and all but one of the objects from the other sites contained multi-phased slags. It can be suggested from these findings that iron obtained by the Roman army was more efficiently smelted than that available to the population of the region. It also suggests that Manning's assertion that the origin of the native iron was the Roman army is incorrect, as it appears the army were not using material from the same smelting sources.

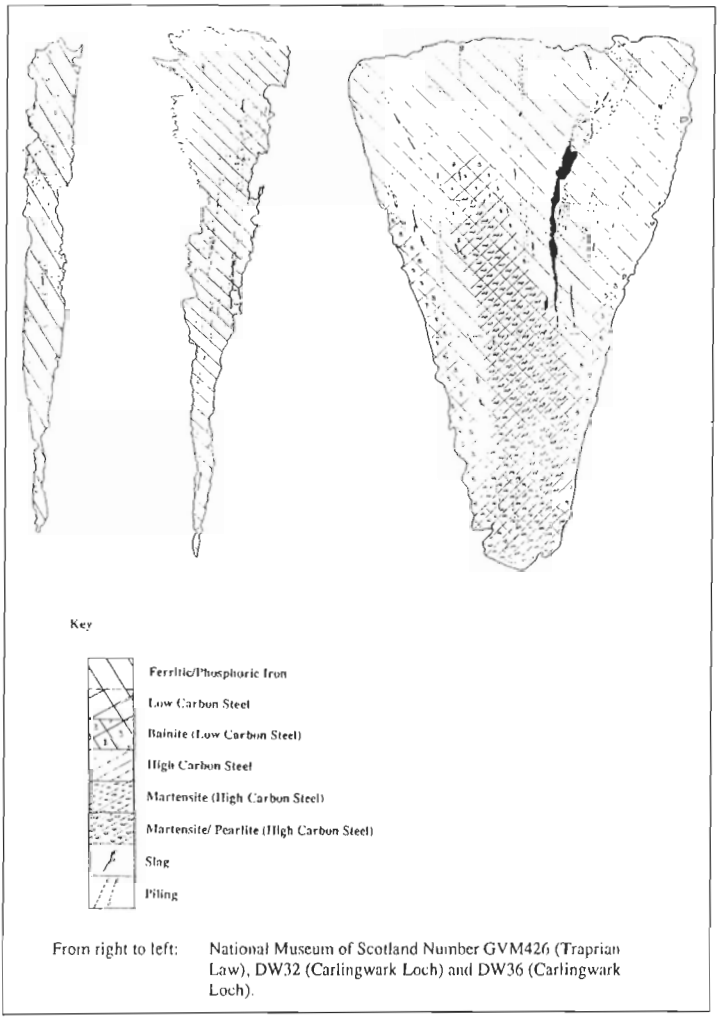

Figure 3 Examples of three 'native' knives, all showing remnant directionality in thier slag stringers.

5) The Newstead knives showed four instances of composite construction, where a steel blade is welded at the smithing stage onto a non-steel ferritic core. With this technique the smith can achieve the best of both worlds, a hard and sharp but brittle blade backed with a soft malleable back. None of the objects from the native sites exhibited use of this technique. Composite constructed knives are easier to make than edge carburised blades because the control of the cooling need not be so precise. An entire bloom can be carburised, i.e. turned to high carbon steel, then cut into segments and the segments welded to ferritic low carbon cores. The difference between wrought iron or ferritic iron and steel amounts to the level of carbon content and the number of slag inclusions, both are lower in steel making it harder but more brittle than wrought iron; in antiquity this could be achieved through the quenching of hot wrought iron. Other studies have noted the use of composite construction in Roman blades: Tylcote's and Gilmour's 1986 work included a variety of blades from Roman military and civil contexts and found that many were of a composite construction. Musgrave's (1993) recent study of thirty-one Romano-British iron objects from Caerwent found 'localised carburisation' at the edge of three blades, here the reason for it was not discussed and it seems likely that these too are composite constructed.

Though none of the items from the non-Newstead sites were of a composite construction in the sense of a hard edge welded onto a soft core, one item, a razor, was pattern welded. This is a technique where low and high carbon irons are welded together into layers then forged into the final implement. This item does not conform to a Roman type. There is no reason to believe that pattern welding was adopted by native smiths due to Roman influence. Lang's study of Iron Age and Roman swords from the south of England showed that pattern welding as a technique was being used as early as the Middle Iron Age and that Roman smiths were using carburisation as an edge sharpening technique but that Iron Age sword smiths were not (1984, 1988).

One item from Carlingwark Loch, a draw knife used for planing timber, showed the effects of having been quench cooled. This was the only item in the study that showed this method of deliberate carburisation, all the other carburised items were composite constructed or pattern welded. The edge of this knife was high carbon tempered martensite which is both very hard and brittle. Metallographically, there were quench cracks at the grain boundaries caused by a very fast rate of cooling. This object shows that if this is the product of a native iron smithing technology, and there is no reason to suppose that it is not as, typologically, it does not conform to Roman types, then these smiths had a sophisticated control over the material and were aware of edge hardening techniques but chose to use them only in specific cases. A draw knife would need to be sharp and preferably stay sharp.

In addition, all the objects were tested for hardness at the blade and the core and the results were examined for variation. It was found that there was no significant difference in the hardness of blades from Newstead and those from the other four sites. Although, the sample was very small, results from other studies (Tylecote & Gilmour1986; Lang 1984) were added into the group and it appeared there was a slight trend towards increased hardness in Roman blades. The difference between Roman blades and those of the native population would, however, have been functionally indistinguishable. Yet, as has been described above, the two groups are technologically distinct. There are therefore at least two smithing traditions operating in this region during the Roman period, one used by the army and at least one other used by local smiths.

Discussion

At the edge of the Roman Empire 'romanization' apparently did not extend to the transfer of technological information. Work such as MacInnes (1989) shows that a trade in artefacts was prevalent in this region during the Roman period, as illustrated by the components in the hoards. However, this 'trade' was probably embedded and restricted to specific goods and possibly to a specific section of the population.

There are a number of possible reasons why there was no transfer of smithing technologies. Cleere (1984) states that iron was a determining element in the economy of the Empire and it was mass produced at specific locations such as the Weald and the Forest of Dean, though here recent survey work has indicated that there are many other smaller smelting sites in Britain (e.g. Cowgill's work in Lincolnshire). However, Cleere's assertion probably still holds true for iron used by the army. Potentially in the second century the army may have had a strategic advantage in its ability to mass produce iron. It is possible that the army actively secured this surplus not wishing a potential aggressor to be in possession of the means of producing vast amounts of weapons. This could explain why over one million nails were deposited in a pit at the northern fort of Inchtuthill.

An ethnographic analogy may be instructive in understanding the ancient situation. Van der Merwe and Avery's study of traditional Malawi smelting technology showed it to be in decline, despite its religious significance, due to undercutting by western made iron, mainly British imports. In Malawi the cost of a British made hoe was $2.50, the equivalent of the local cost of a large chicken or two days wages for a skilled labourer. In contrast, within the Malawi tradition production of enough iron to make a hoe represents around a months labour (van der Merwe & Avery 1989).

In applying this recent historical situation as analogous to the Borders region in the first and second centuries it can be postulated that native ironworking was more costly than the mass produced Roman iron and therefore able to produce fewer objects. This then may explain the scarcity outside of votive deposits of native ironwork. The Roman army may have consciously starved the native population of relatively cheap iron in order to retain a strategic advantage.

Van der Merwe and Avery also show that in some societies the magical, ritual, symbolic, religious and social aspects of iron production are more significant than considerations of practicality and rationality as a western viewpoint would see them. For instance, the Phoka of Malawi used high phosphorus ores that analysts considered completely unsuitable for smelting and travelled several days out of their way to obtain these ores when there were known local sources that would have produced a 'better' end product because the ores were magically more propitious (van der Merwe & Avery 1989). To some extent this may have been the case with the native ironworking tradition also. A view partially supported by the contexts in which native iron appears, in an unfinished or broken condition in votive deposits and rarely anywhere else. This can be construed as indicating that iron was a ritually important and magically charged material. Possibly Roman iron objects and the techniques used to produce them were in some sense profane within a native metaphysical system.

Conclusion

The results of this study indicate that there were at least two iron smithing traditions in the Borders region of Scotland in the Roman period, one used by the Roman army and the other used by the

native population. Manning's assertion, that all the ironwork found within hoards in this region from this period was of Roman origin, and more specifically brought in via the army, appears to be mistaken. However, Manning is correct in suggesting that there was a lack of romanization taking place. It has been argued here that both sides had reasons to resist a greater integration of ideas and a transmission of technological information. The Roman army did not want to strengthen a potential aggressor and the indigenous population did not want their belief system challenged by a more 'practical and rational' metaphysical system. These cultural disharmonies might be reflected in attitudes to iron production. It is further suggested that broad cultural attitudes, and in this case, metaphysical disharmonies may be inferred from this archaeological record. Iron, although archaeologically often on the surface an unremarkable material, was an important substance and powerful symbol during this period. Therefore, the act of iron production was imbued with wider cultural implications in addition to being crucial to survival.

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