A review of metallographic analyses of early medieval knives

Eleanor Blakelock and Gerry McDonnell

ABSTRACT: Early medieval knives provide a wealth of technological data, including information about the quality of iron alloys and smithing techniques (such as manufacturing techniques and heat treatments), and information on cultural aspects such as the treatment of knives found in cemeteries and whether they differ from settlement knives. This paper synthesises the metallographic data obtained from the analysis of iron knives recovered from both settlement and cemetery sites of early medieval date, cAD 400–900, with the aim of reviewing the technology used in the manufacture of these knives. Data from 79 knives has shown some clear differences in the manufacture of knives found in cemeteries compared with those found at settlement sites. Most of all, the data demonstrates the paucity of archaeometallurgical investigations of this vital commodity, and the importance of reviewing and re-assessing past studies.

Introduction

A number of archaeometallurgical investigations of early medieval iron artefacts have been carried out, more than from any other period. These results now require further analysis and interpretation especially in the light of our new understanding of the high levels of craft skills attained by early medieval smiths (Mack et al 2000). The knife is one of the commonest iron artefacts found during excavations of both early medieval settlements and cemeteries. Archaeometallurgical examination of knives provides a deep insight into ironworking technology and skills. Many knife blades are composite artefacts having ferritic or phosphoric iron backs, with inserted steel cutting edges. The quality of the iron alloys, the skill in manufacture, and the effectiveness of heat treatments can all be revealed by metallurgical analysis of the blades. The archaeometallurgical analysis of iron knives therefore provides an exceptional opportunity to analyse the ironworking skills of a society. These studies can be integrated into archaeological typological studies of knives, hence providing an enhanced holistic study of these vital artefacts in this period.

The primary aim of this paper is to review the technology used in the manufacture of early medieval iron knives, spanning the period cAD 400–900. A synthesis of the metallurgical evidence derived from the metallographic analysis of 79 knives, together with X-radiographic study of a further 235 examples, is presented. The data is analysed chronologically, regionally and through comparison of data from settlement sites and cemeteries (Fig 1). The data is then placed in a wider context by summarising the evidence for knife manufacture from preceding and subsequent periods.

Background

Previous archaeometallurgical studies of iron artefacts from early medieval contexts have shown that during the 5th–11th centuries AD the highest level of smithing skill was achieved (McDonnell 1989c, 380; Mack et al 2000). This suggests that new, better iron-working techniques were being used in the post-Roman period. Study of artefacts from the early medieval urban site at Hamwic revealed that high-quality high-carbon steels were produced by refining cast irons. This showed that the Anglo-Saxons had a high degree of sophistication in the use of alloys and manufacturing techniques, and used them to produce steel-edged tools such as knives (Mack et al 2000).