The Classification of Chalcolithic and Early Bronze Age Copper and Bronze Axe-heads from Southern Britain

Stuart Needham

Access Archaeology

Archaeopress Access Archaeology

Archaeopress Publishing Ltd
Gordon House
276 Banbury Road
Oxford OX2 7ED

www.archaeopress.com

ISBN 978 1 78491 740 1
ISBN 978 1 78491 741 8 (e-Pdf)

The Classification of Chalcolithic and Early Bronze Age Copper and Bronze Axe-heads from Southern Britain

The scheme presented below is based on the author's previously unpublished doctoral thesis (Needham 1983)[1] which presented a corpus and full classification of flat, low-flanged and long-flanged axes (strictly axe-heads) of the Chalcolithic and Early Bronze Age for central and southern England. Although some aspects of the classification and some particular types have been defined in past publications, the scheme as a whole has not been presented in published form. The northern boundary of the study area was defined by the Mersey and Humber rivers, the material beyond having already been catalogued by Schmidt & Burgess (1981). Similarly, Wales was excluded because the equivalent material there was due to be published as part of another project;[2] in the event this did not happen. However, much of the Welsh and northern British material, as well as many finds from Ireland and the near-Continent, were studied at first hand by the author in order to gain a finer appreciation of inter-comparisons and potential regional aspects of the assemblages. It was concluded that there were some important differences between the study assemblage and those in northern Britain and Ireland (e.g. Needham 2004, 219- 23), although many individual types can have close parallels in the three respective regions. The Welsh assemblage, however, presents little obvious differentiation from that in central and southern England and the scheme presented here may be readily applied to axes from all of southern Britain and probably beyond.

A detailed classification has been published for northern Britain (Schmidt & Burgess 1981), but this is not directly transferrable to the southern material for two main reasons. Firstly, the assemblage of axes in the south has a different composition in morphological terms even though many individual axe forms are the same in both regions; the text below will detail some of the differences. Secondly, however, Schmidt & Burgess's scheme seems not always to have been successful in grouping alike axes and distinguishing between unlike ones; the best parallels for a given southern type amongst the northern axes have frequently been found to include examples attributed to different types in that corpus. Lack of morphological coherence is even more acutely the case for the Irish classification produced by Harbison (1969). Given this pervading problem, it was felt crucial to put assessment of formal characteristics on an objective footing.

The author's methodology relied on two principal tenets. First and foremost the condition of an object must be evaluated before any attempt at classification is made; surface loss through corrosion, sometimes exacerbated through modern 'cleaning', can have a significant and variable effect on the original outline and can also obscure evidence for breaks which would be obvious on an object in good surface condition (not to be confused with a complete state). A layer of corrosion of constant thickness across the faces and sides of an axe will be doubled where two faces converge at any acutely tapered part of the object, notably the butt, cutting edge and flange crests; these then become particularly vulnerable to subsequent attrition (the principle is illustrated in Needham *et al*. 2015, Appendix S1, 2 fig S1). Shallow or subtle surface features will also be vulnerable to total loss – stop-bevels, edge bevels, decoration and original working and wear traces. This contrast can occasionally be seen strikingly on axes on which fragments of original oxidised surface (generally called 'patina') survive and

[1] Now available on-line through EThOS
[2] Bronze Age Metallurgy in Wales, Colin Burgess & Peter Northover

stand proud of *reduced* surfaces where that original surface has been removed by disintegration of any kind, such as flaking, crumbling or abrasion.

Despite these difficulties, an attempt must be made whenever possible at estimating original outlines in both plan and profile view. Providing it is done empirically and systematically, this procedure gives the best chance of finding the most useful classification criteria, which are often carefully chosen points within a spectrum. The same procedure must of course then be applied to any future finds if they are to be placed successfully within the classification scheme. Although reconstructed outlines may not be accurate (only where small bits are missing from an object in good surface condition), they will be *more* accurate than the extant outlines providing that reconstruction is informed by knowledge of axes in good condition. To give one example, Class 3 axes always taper to a fairly thin butt in profile unless reworked there after damage; consequently, it is reasonable to project the plane of the faces in profile beyond a butt fracture to obtain an estimate of its original length. Outline projection has, however, only been attempted when the missing part is small relative to the whole.

The second tenet is that if we seek to group objects that are similar in their external morphology (and this does not exclude other approaches to classification) then it is best to objectify the description of the relevant morphological attributes. As an example, if we are going to talk about *broad-butted* axes as distinct from *narrow-butted* ones, then it is essential to provide some kind of value for where the boundary between 'broad' and 'narrow' best lies. This kind of objectivity has been achieved by using a number of fairly simple metrical indices for shape and proportions. Evaluation of metrical ranges within a type and metrical boundaries between types is best undertaken using appropriate *dimension ratios* because absolute dimensions do not compensate for different sizes of object within a type. The critical dimension ratios are defined below.

While it may be assumed that early metal age people themselves would recognise many of the form differences being identified by us, it is not suggested that they would always recognise as significant the exact boundaries extracted from rigorous and objective classification methods. Metrical objectivity does, however, ensure that we are achieving what we aim to achieve, a formal classification that genuinely groups together similarly shaped objects and sets apart dissimilar ones. Using ratios as opposed to absolute dimensions certainly solves the problem of assessing morphological similarity or dissimilarity. However, it needs to be acknowledged that either human perception or functional requirements may sometimes lead to a drift in ratios seen against changing object size. For example, if it was crucial to keep the cutting edge at a certain width to serve particular functions, then that dimension may not have been reduced in proportion to length as the overall size of the axe was reduced. There is no perfect answer to this potential dilemma, but it needs to be kept in mind during data analysis and interpretation. The author's experience suggests that this kind of sliding relationship between a ratio and absolute size is not a significant feature of the early metal age axe sequence.

The use of statistical methods for finding the best grouping of the axes was rejected because it was felt that, firstly, not all the information contributing to it could be satisfactorily reduced to numerical indices, secondly, there are often problems in deciding whether to give different weighting to different kinds of attribute information, and thirdly, it gives little room for value judgements on where to place divisions based on broader archaeological information, for example association patterns or metal composition. There is the additional problem for a lengthy sequence of material spanning some centuries that one particular attribute may be incredibly important at one point of the sequence and wholly irrelevant at another. The more judgemental approach taken here allows different critical attributes to come into prominence and then wane in a rolling sequence.

The finest sub-divisions of types proposed in 1983 have been left out here. These divisions were referred to as ‘styles’ and were an attempt to group together, where relevant, axes of extremely similar proportions for which it was felt possible they would be products of the same group of metalworkers and even occasionally derived from the same mould or pattern. There are, however, problems with such a premise, especially when a production tradition results in a high degree of standardisation around one or few ideal models. In such cases some objects are bound to come out very similar to one another simply because their producers were successful in adhering tightly to the ideal model(s); the resulting similarity need imply no more than that two objects were products of that coherent tradition.

Ultimately, any level of classification only becomes meaningful through correlations with other independent data – for the material under consideration here the key data are context, time period, metal composition, geography and decoration.

Decoration, embellishment or careful finishing beyond the needs of practical use are the norm on early metal age axes and can be considered integral to their character throughout the series. There are two modes of execution for decoration or embellishment: tracer-punching to form patterns of short linear strokes or occasionally dots, and hammer-forging to form larger faceted or fluted areas. Decoration/embellishment can occur on either the faces or the sides, and is often present on both. Taking only axes in reasonable surface condition, the proportion of axes lacking any kind of embellishment is surprisingly low: even at the beginning, in the Moel Arthur Assemblage, it is only around 50%; it then decreases to 33% in the Brithdir Assemblage, to below 20% in the Mile Cross Assemblage, and to just a few percent in the Willerby Assemblage. This zenith in decorating and embellishing axes may continue into the beginning of the Arreton Assemblage, but then there was a small reversal so that overall about 15% of Arreton Assemblage axes are totally without. The full sequence of changing styles of ornamentation is rich and complex (Megaw & Hardy 1938; Needham 1983, chapter 14) and only a brief summary will be given here.

The earliest embellishments occur on Class 2 copper axes – simple but neat facets and furrows (see Type series nos. 7-14). For half of Class 3 axe currency embellishment remains equally simple although triple longitudinal faceting of the sides is added to double (nos. 26 & 34). However, late in the Brithdir Assemblage, more formal punched decoration emerges on Class 3 axes (notably 3E), initially as ‘rain-pattern’ designs (Needham 1987). This is quickly diversified into other designs such as herringbone or chevron rows during the Mile Cross Assemblage. New arrangements of fluting, notably longitudinally splayed designs, are also occasionally found. At this stage decoration occurs on both Class 3 (notably 3F) and Class 4 (i.e. 4B) axes. A little later side decoration becomes more ornate with the creation of strings of lozenge facets; when the axe is viewed in plan, these lozenge strings give the sides a gently scalloped outline (e.g. Type series nos 60, 61, 63 & 65).

By the Willerby Assemblage, face decoration is frequently set within a more formalised panel, sometimes with a complex infill of punched strokes. In many cases this panel is restricted to the upper part of the blade and is bordered on the underside (hence above the edge bevel) by a broad and shallow horizontal hammered furrow. Although subtle, this feature contrasts with and complements the panel in the way light plays on it. Diagonal fluting (‘cabling’) of sides is occasionally found on low-flanged axes but becomes more frequent as flanges become higher and sides correspondingly broader on Class 5 axes

(Arreton Assemblage). There is a late resurgence in more complex patterns of shallow hammered furrows on faces on Class 5 axes. They are frequently used in multiple to create fluted panels, the furrows sometimes aligned diagonally as well as orthogonally. Occasionally the two modes of execution are used in combination, furrows serving as an underlay to punched designs.

Notes on the illustrative type series

The main purpose of the axe drawings in Figures 17 – 32 is to illustrate as clearly as possible the defining characteristics of the types identified in this classification scheme. For this reason the axes illustrated, although based on actual examples (Appendix 1), have been 'made good' if there were any minor irregularities caused by fracture, burring or corrosion loss; wherever possible the axes chosen were in good to very good surface condition and complete or very nearly so. Similarly, some incidental features, notably slight twists down the length of the body, may have been suppressed in some drawings. To some extent, therefore, the axes shown are ideal examples. A second point is that the drawings are deliberately not to a consistent scale. Since the classification scheme depends entirely on proportions rather than absolute dimensions, inter-comparison is greatly facilitated by showing the different shapes at approximately the same size. Nevertheless, a few axes are deliberately shown larger or smaller than the majority to make the point that exceptional sizes are an important part of the range for the type in question. Not all variation within a defined sub-class or type is shown, but the full ranges are covered by the metrical attributes provided in Table 1.

Table 1: Flat and low-flanged axes from southern Britain: critical relative dimensions.
NB The values given reflect the core distributions for the type; occasional axes may have values falling just outside for one attribute

Class	Relative butt width		Cutting edge proportions		Body proportions		Side curvature	
	RWB	RWB′	RWE	RDE	EH	RW3	RMO	ASD
1A	≥ 0.38	≥ 0.21	0.55 – 0.70	≥ 0.30	≤ 0.10	n/r	0.07 – 0.10	≥ 0.65
2A	≥ 0.46	≥ 0.27	0.55 – 0.70	≥ 0.30	≤ 0.10	n/r	0.05 – 0.10	n/c
2B	≥ 0.46	≥ 0.27	0.55 – 0.70	≤ 0.30	≥ 0.09	n/r	> 0.025	n/c
2C	≥ 0.46	≥ 0.27	0.55 – 0.70	≤ 0.31	≥ 0.11	n/r	> 0.025	n/c
2D	≥ 0.46	≥ 0.27	0.55 – 0.70	≤ 0.32	≥ 0.14	n/r	< 0.025	n/c
2E	n/r	n/r	> 0.70	n/r	n/r	n/r	n/r	n/r
3A	0.38 – 0.46	0.21 – 0.29	0.50 – 0.65	≤ 0.30	< 0.16	0.51 – 0.61	0.04 – 0.08	≤ 0.65
3B	< 0.38	≤ 0.29	≥ 0.66	≤ 0.22	variable	0.58 – 0.75	> 0.06	≤ 0.65
3C	≤ 0.35	≤ 0.23	0.58 – 0.65	≤ 0.22	> 0.15	0.52 – 0.62	< 0.06	≤ 0.65
3D	≤ 0.35	≤ 0.23	0.52 – 0.65	≤ 0.22	0.12 – 0.15	0.50 – 0.58	< 0.06	≤ 0.65
3E	< 0.38	≤ 0.23	0.52 – 0.65	≤ 0.22	< 0.12	0.46 – 0.55	0.05 – 0.10	≤ 0.65
3F	≤ 0.34	≤ 0.19	0.52 – 0.60	≤ 0.16	< 0.12	≤ 0.47	0.05 – 0.10	≤ 0.65
3G	0.34 – 0.42	≤ 0.21	≤ 0.55	0.20 – 0.25	≤ 0.10	≤ 0.45	0.04 – 0.07	≤ 0.65
4A	n/r	n/r	≥ 0.60	0.16 – 0.30	n/r	≥ 0.48	0.07 – 0.10	≤ 0.65
4B	n/r	n/r	0.50 – 0.60	≤ 0.22	n/r	0.41 – 0.48	0.04 – 0.10	≤ 0.65
4C	n/r	n/r	≤ 0.55	0.13 – 0.25	n/r	0.34 – 0.41	0.04 – 0.10	0.45 – 0.75
4D	n/r	n/r	≤ 0.51	0.20 – 0.34	n/r	0.34 – 0.42	0.02 – 0.06	≥ 0.65
4E	n/r	n/r	≥ 0.50	0.17 – 0.37	n/r	0.33 – 0.44	0.06 – 0.15	≥ 0.65
4F	n/r	n/r	0.48 – 0.58	0.26 – 0.34	n/r	≤ 0.32	≥ 0.06	≥ 0.65
axe-chisels	n/r	n/r	≤ 0.45	n/r	n/r	n/r	n/r	n/r

n/r – not relevant to this sub-classification
n/c – not calculated due to large uncertainty in RMO position or too small a sample size