

BRITISH AND FRENCH HANDAXE SERIES

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1. The problem

Although Britain and North France can with justice be described as the cradle of Palaeolithic archaeology, and in a Pleistocene context may be treated as a single region, there has never been a systematic comparison of their Lower and Middle Palaeolithic industries. The writer has therefore been engaged for some time in the documentation and interpretation of observable variation in lithic assemblages on both sides of the Channel, with particular reference to the class of tools known as 'handaxes'; these may be crudely defined as more-or-less bifacially worked, oval or leaf-shaped stone artefacts. The duration of these tools in the area is open to question, but at a conservative estimate they may be said to cover 200,000 years prior to 40,000 B.P.

Various groupings of sites within this period have been proposed by other workers - sometimes attached to cultural labels, sometimes reflecting date rather than similarity. In Britain and North France the discussion has rested rather heavily on the handaxe component as having been more assiduously collected in the heyday of gravel digging by hand than were the less spectacular flake-tools and knapping waste. One goal is therefore an examination of phenetic relationships, and the detection where possible of modalities within the spectrum of variation among handaxe assemblages. A second aim is an evaluation of the implications of such methods as have been proposed for dealing with this and similar archaeological material, and the extent to which the choice of a particular typology, for instance, is likely to influence the resulting configuration of assemblages.

2. Recent work in the same field

The absence of uniformity of terminology in Palaeolithic archaeology may appear strange to those working in other, more orderly areas of prehistory. In particular, it is virtually impossible to make detailed typological comparisons across the national frontiers of Europe by means of the literature. While there may be some degree of consensus in a single country, prehistorians from Germany, France and Britain have evolved quite different systems for the classification and description of handaxes and other stone tools. Some of the factors contributing to this are:

- (a) A low degree of standardisation of manufacture (bronzework for instance lends itself to quite exact duplication - through the casting process - and was moreover the product of skilled craftsmen who had to provide wares acceptable to their market, whereas the effort required to make a close copy of, as opposed to a viable substitute for, a given stone tool is considerable).
- (b) The function of many flint tools is unknown; consequently it is not easy to decide which attributes should be used for descriptive purposes.

- (c) Low sampling densities (e.g. one usable assemblage per 5000 years in the case of the British handaxe series) may tempt the prehistorian to apply a single system of classification to assemblages which are widely separated in time or in true cultural affinities. As a result he may ignore axes of variation which are informative about phenomena of more limited distribution.

In recent years the need to effect a formal comparison between assemblages including handaxes has encouraged the use of metrically-based methods of description; in France the set of measurements most widely adopted is that proposed by Bordes (1961), while in England Roe (1964 and 1968) has employed slightly different criteria. Both are concerned almost exclusively with gross morphology.

Since Bordes was primarily concerned with the construction of a descriptive typology he chose arbitrary threshold values for certain ratios which in conjunction with other observations are incorporated in a 'key' for classification. Roe devised a three-way partition ('pointed', 'ovate' and 'cleaver' types) on the position of greatest width, and then grouped the assemblages using the resulting percentages. Further division was effected with the aid of additional observations. His measurements were subsequently used by Graham (1970) in a canonical variates analysis to examine inter-site relationships, with results rather different from those of Roe, and Hodson (1971) used a sample of the same data in an experiment in the taxonomy of handaxes rather than sites (other, single assemblage studies include Cahen and Martin 1972 and Barral et al 1971).

With the exception of Graham, the above workers have attempted to define a means of assigning handaxes into classes to give a simplified description of each assemblage, suitable for inter-site comparison at a later stage. While Graham's result is of interest, the multimodality of many series suggests that a more cautious approach is preferable.

3. Data

Roe had already taken 9 observations on a large number of British handaxes, and very generously made them available to the writer. Additional measurements were taken for these pieces, either from the specimens themselves or (where this was not possible) from Roe's drawings; in the latter case a further seven observations were obtainable for most handaxes; these extend Roe's set by paying more attention in particular to the profile and to the details of the tip. Moreover the recording of the width at the midpoint provides compatibility with Bordes's methods. A more extensive set of 34 qualitative and quantitative observations was obtained for key British sites as well as some 38 French assemblages (four series from S.W. France were included for comparative purposes). In all, 81 usable assemblages were available with an average sample size of just under 100.

Both 'Lower' and 'Middle' Palaeolithic handaxe series were used, as it seemed preferable to demonstrate the distinction on a post-eriori grounds.

4. Methodological considerations

The analytical sequence 'construction of typology - classification

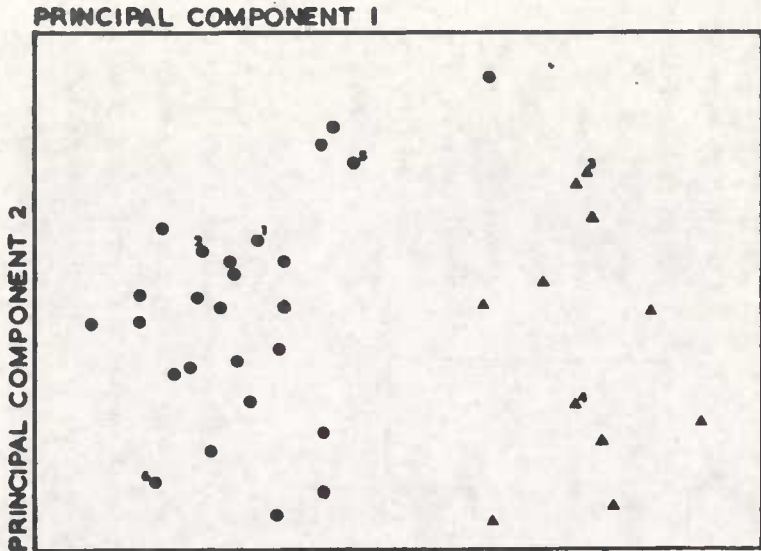


Fig. 2: Principal Components 1 and 2, French assemblages only. Arcsined percentages (for further details see Fig. 4). Percentage variance 31 and 21.

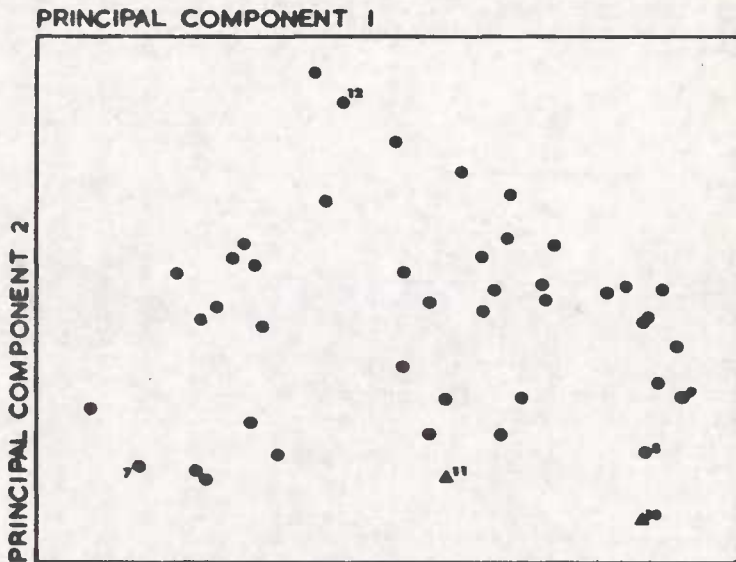


Fig. 3: Principal Components 1 and 2, British assemblages only. Arcsined percentages (for further details see Fig. 4). Percentage variance 26 and 19.

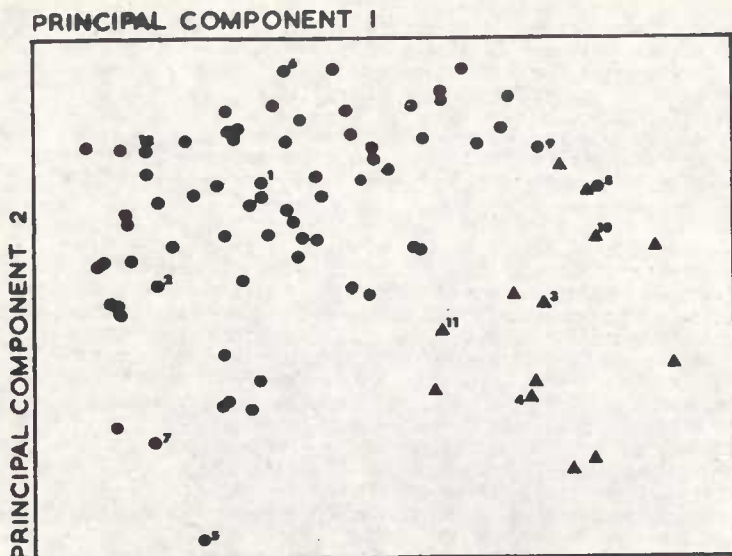


Fig. 4: Principal Components 1 and 2, all assemblages. Arcsined percentages on 16 classes of handaxe based on Bordes's classification. Percentage variance 30 and 19.

Key: \blacktriangle 'Mousterian' sites; 1 Atelier de Commont, 2 Cagny-la-Garenne, 3 Le Moustier, 4 Catigny, 5 La Micoque, 6 Oissel (Carpentier), 7 Barnfield Pit M.G., 8 Tilehurst, 9 Rickson's Pit M.G., 10 Oldbury, 11 Shide, 12 Farnham Terrace A.

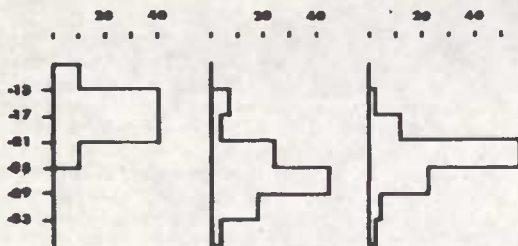


Fig. 5: Distribution of the standard deviation of the length:breadth ratio. Percentage frequencies for 10 Mousterian assemblages (left), 29 French Acheulian (centre), 42 British Acheulian (right).

Very similar results are obtained after taking logs.

of artefacts - inter-assembly comparison' has long been a fundamental concept in archaeology, and the advent of the computer has served to facilitate the process, increase its potential and encourage greater rigour. A further benefit is the great flexibility of approach which is now possible: once the data has been filed, a total change of strategy requires only the preparation of a new set of instructions and their running on the machine. Above all, feedback can be built into the design of an experiment and a rapid response made to unexpected developments.

A considerable advantage of this flexibility is that a set of coordinate axes or a typology need be used only for the purpose to which it is best suited, and can be redefined to meet the needs of a new problem. In particular, a set of assemblages may be divisible into subsets by certain criteria, while quite different axes of variation may be more usefully examined during the investigation of individual subsets. Such an approach is more reasonable than the assumption that a single typology gives an adequate description of all useful variability (except where the assemblages are known to belong within a cultural tradition exhibiting a high degree of uniformity of tool morphology, as opposed to relative frequency).

The practical implications of this are illustrated by Fig. 1, in which is examined the effect of slightly varying Bordes's primary criterion, separating 'thin' and 'thick' handaxes. The division into two clusters of chronological significance proves very robust - 'Mousterian' handaxes are almost always short and thin, though they may be either 'ovate' or 'pointed' in Roe's sense. On the other hand, the larger, 'Acheulian' group exhibits considerable instability, and it may be supposed that if it possesses marked internal structuring the existing criteria are inadequate for its description; thus instead of treating all handaxe series as a single population in devising a typology (as have other workers) one should allow for at least two, whose axes of variation cannot be assumed to be the same as those discriminating between the populations.

5. Results

As an initial step, 16 arbitrary classes were defined using a modified version of the Bordes typology based on metrical data only. Various clustering techniques and a principal components analysis were run on the resulting percentages, after transformation, in a search for modalities which might suggest with other (e.g. dating) evidence that the list of sites ought to be considered in two or more parts. In the case of Fig. 2 (France only) the 'Mousterian'/'Acheulian' division apparent in Fig. 1 is repeated whereas the diagram for British sites (Fig. 3) is dominated by variation in the Acheulian - Oldbury and Shide being the only series given a 'Mousterian' label by Roe on account of their 'bout coupe' types. Taking all the assemblages, the integrity of the Mousterian is preserved (Fig. 4), though certain British 'Acheulian' sites with high percentages of short ovates - Tilehurst and Rickson's Pit - overlap part of their distribution (other variables, e.g. S-twist and geometry of section, greatly improve discrimination, however). As was suggested by Fig. 1, therefore, a strong case can be made for regarding the problem of Mousterian handaxe typology as distinct from that for earlier series. However even at this stage some important local differences emerge - thus thin triangular handaxes as defined

by Bordes (1961, 58) are fairly numerous in France, and supposedly typical of the Mousterian, but the writer has been able to identify a total of only 8 in this country (including individual finds), highlighting the very sparse occupation of the area in early Wurm. Moreover, an examination of the descriptive statistics indicates that individual Acheulian sites in Britain are more specialised than their French counterparts (Fig. 5).

Artificial 'type' frequencies are clearly unsuitable as data beyond this point, and it is necessary to return to the handaxe attributes for the definition of types which reflect preferences within the shape distribution. As a first step, cluster analyses were performed, on standardised log-transformed data, to identify structure in each assemblage - in some as many as six groups are suggested, in others no clear grouping is apparent using the un-weighted measurements. The direct use of canonical variates analysis to compare assemblages is therefore not possible.

Several approaches are possible to derive variable weightings. The simplest is to employ standardised principal components for the total data, but this is liable to give undue weight to variability between exceptionally well-represented sites, or between the most common shapes (cleavers for example are too rare to have much effect on the component axes despite being almost certainly a valid class). The same disadvantage lies in Hodson's approach in which the total data are sampled; scarce types are liable to be swallowed up by amorphous groups of large variance before stability is achieved unless the majority of the variables used contribute something to their isolation.

The strategy proposed by the writer is the use of 'clusters' thrown up by the assemblage-by-assemblage analysis, rather than the sites themselves or clusters derived from the entire data, to provide canonical variates (sites which are too poor or which exhibit no clear structure but considerable variability being ignored). The site-by-site classification of handaxes can then be repeated in the variate space; this in effect creates a separate typology for each assemblage. A plot of the resulting cluster means for the total data, e.g. using MDSAL, can then be expected to exhibit denser areas where a particular type occurs unchanged in different sites. The addition of a time dimension might well suggest that changes of shape previously identified as replacement of one type by another reflect rather the evolution of a single type (Fig. 6). A conventional typology could be defined by a partition of the canonical variate space, for any subset of the set of sites.

Preliminary results for the Acheulian suggest that some types e.g. the concave sided ficrons and elongated ovate limandes, are repeated in many series with little variation, whereas the 'thick ovate' region of the shape distribution (not properly catered for in the Bordes scheme) exhibits much less standardisation.

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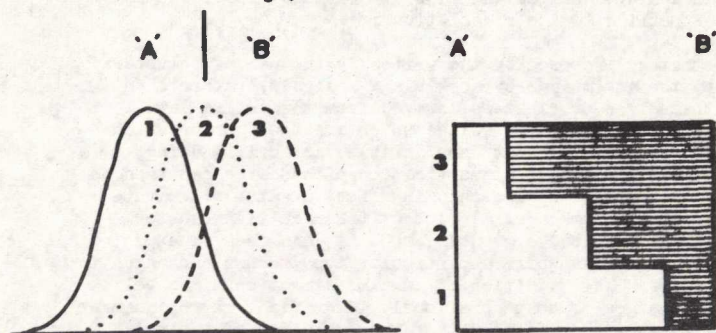


Fig. 6: The result of applying a 'static' typology to a 'dynamic' situation - a tool type undergoing morphological change through time.
Left: morphological variability on x-axis, frequency of occurrence on y-axis.

Right: frequency of occurrence on x-axis, time on y-axis.

The imposition of an arbitrary subdivision into two types A and B gives an illusion of replacement of one type by another during the sequence represented by assemblages 1, 2 and 3.