Classification of Lithic Artefacts from the British Late Glacial and Holocene Periods

Torben Bjarke Ballin
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My interest in lithic typology began in the early 1980s, when as an unemployed librarian I went for long walks, started finding lithic artefacts, sites and assemblages, and subsequently read most of Dr Søren H. Andersen’s production to identify what I had found. When I enrolled at the Prehistoric Institute, Aarhus University, Denmark, in the mid-1980s, Søren H. Andersen became my teacher in Palaeolithic/Mesolithic Studies, and I learnt much from him. In the early 1990s, I spent a number of years in Norway where I honed my typological skills on the 700,000-piece lithic assemblage from the Farsund Project, SW Norway, as well as numerous other assemblages. I would like to thank Dr Perry Rolfsen, Oldsaksamlingen, Oslo, for inviting me to do this work and supporting me along the way. After having arrived in Scotland in 1998, I obviously read what was available on Scottish and British lithics, and had many highly inspiring and educational discussions with the late Alan Saville, Principal Curator at National Museums Scotland. Alan is sorely missed.

During the writing of this book, Dr Andrew David, formerly of English Heritage, kindly commented on several drafts of the manuscript, and he also permitted me to use many of his excellent line drawings of lithic artefacts. It would not have been possible to produce this volume without his input. At the end of the process, Professor Karen Hardy, Universitat Autònoma de Barcelona, reviewed the final draft of the manuscript. I am grateful to them both. Thanks are owed to Beverley Ballin Smith for copy-editing the volume.

Drawings and photographs have been borrowed from my own publications, but also from the works of colleagues, and I am grateful to all archaeological institutions and units, authors and excavators, as well as artists and photographers who permitted me to use their illustrations. Permission was obtained from the following institutions: National Museums Scotland, Edinburgh; Amgueddfa Cymru/National Museum Wales, Cardiff; Tenby Museum, Tenby, Wales; and The Danish National Museum, Copenhagen. Permission was also granted from the following archaeological units: Argyll Archaeology, Argyll; Cameron Archaeology, Aberdeen; CFA Archaeology, Edinburgh; GUARD Archaeology Ltd., Glasgow; Headland Archaeology Ltd., Edinburgh; and Murray Archaeological Services Ltd., Aberdeenshire. The following authors, excavators and curators also gave me permission to use their material: Principal Curator Martin Appelt; Professor Nick Barton; Dr Barry Bishop; Dr Ann Clarke; Dr Andrew David; Dr Jørgen Holm; Dr T.G. Manby; Dr Michael Reynier; Dr Derek Roe; Principal Curator Alan Saville/Annette Carruthers; Principal Curator Peter Vang Petersen; Professor Pierre Vermeersch; Dr Katherine Walker; and Ms Caroline Wickham-Jones. Comments, advice and other forms of assistance were offered by: Dr Berit Eriksen; Dr Catherine Frieman; Dr Frances Healy; Dr Elizabeth Healey; Professor Marcel Otte; Dr Lou Schmitt; Principal Curator Alison Sheridan; Principal Curator Elizabeth Walker; and Dr Mara Weber.

The volume’s illustrations are by the following artists and photographers (P): Beverley Ballin Smith (P); Jordan Barbour; Nick Barton (P); Alan Braby; M.H.R. Cook; Andrew David; Leeanne Demay (P); Jan Dunbar; Jørgen Holm; Sandra Kelly; Jim Leary (P); Hazel Martingell; T.G. Manby; Woody Musgrove (P); Gunther Noens; Marion O’Neil; Annette Olsson, Michael Reynier; Allan Saville; Joyce Smith (P); Alexandra Speir; Thomas Thomsen (P); J. Swain; Jeff Wallis; and Leeanne Whitelaw.

Every effort has been made to obtain permission to reproduce illustrations; if any have been reproduced inadvertently without permission, I hope that my apologies will be accepted.

Although support and advice has been received along the way, I take full responsibility for any surviving errors.
Preface

Only a small number of guidebooks on British lithic typology have ever been produced, the most important of these being Evans’ *Ancient Stone Tools of Great Britain* (first edition 1872; second edition 1897) and – more than a century later – Butler’s *Prehistoric Flintwork* (2005). In addition, volumes on lithic typology and technology have been published outside Britain, but in English, such as Inizan et al.’s *Technology of Knapped Stone* (1992; first English edition 1974). The latter is a highly useful typological manual to all lithics specialists and enthusiasts throughout the world. Recently, an attempt was made to produce a thesaurus or encyclopaedia of British lithics – including typological, technological and other aspects of the field – but this impressive project was sadly never completed (Healey 2005).

These different volumes were structured in a number of different ways. Some were organised by type (e.g., Evans 1897), others by period (e.g., Butler 2005), whereas some were organised alphabetically (e.g., Inizan et al. 1992 and Healey 2005). The structure of the present book corresponds mostly to that of Evans (‘... reducing the whole series into some sort of classification...’; Evans 1897: 1), and it is sorted by type. However, where Evans’ types were sorted according to the author’s subjective idea of which types were the most important, spectacular or interesting, the present volume is organised on the basis of a form of hierarchical classification system, where the main classes (debitage, cores, preparation flakes and tools), are subdivided into main types (e.g., arrowheads, scrapers, piercers, etc.) and then sub-types (e.g., end-scrapers, side-scrapers, hollow scrapers, etc.) (Figure 1).

The intended audience of this volume is expected to include students, museum staff, non-specialist colleagues, local groups and lay enthusiasts. Although I hope readers will find the book useful, it is important to emphasise that my intention was not for it to replace the works listed above, but to complement them. Although the above volumes all deal with typological matters, their slightly different foci and structures mean that different people may find different works more or less useful in different contexts. Evans (1897), Inizan et al. (1992) and Butler (2005) will continue to be valuable reference works.

This typological guidebook represents approximately five years of work, from the first notes in 2015, through the ScARF workshop in early 2017 and the BAJR lithics guide later in 2017, to the final push during the 2020 Covid-19 lockdown, resulting in the publication of the present book. It should be borne in mind, though, that typological work never reaches an end. Over the years, debitage, core and tool types have been re-interpreted: some ‘chisels’ became ‘bipolar cores’, and new types were discovered, such as the Middle and Late Neolithic ‘Levallois-like cores’. In a decade or two we are likely to be in a different place from the present, with yet other lithic types having been either reinterpreted or discovered. It may then be necessary to replace or complement this typological guidebook.

Until then – I hope you will find the book useful.
Classification and characterisation of lithic artefacts

The background to and aims of the present volume

As a lithics specialist, the author is frequently asked to organise lithics workshops, the main purpose of which is to teach anybody with an interest in prehistoric lithic artefacts the basic elements of this specialist field. Some of these workshops were aimed at staff and volunteers at local museums, whereas others were aimed at university-based colleagues, colleagues in archaeological units, enthusiasts taking part in adult and continuing education (DACE), or local volunteer groups.

In March 2017, the Scottish Archaeological Research Framework (ScARF) organised a lithics workshop in Edinburgh. The author was one of several speakers, and he gave a ‘hands-on’ presentation of the main types of lithic debitage, cores and tools that people interested in early prehistoric archaeology may encounter. Following this event, British Archaeological Jobs and Resources (BAJR) contacted the author, and it was agreed to transform the author’s ScARF presentation into a BAJR guide for British lithics (Ballin 2017c). The latter guide should be perceived as a brief introduction to lithics showing the reader ‘how to squeeze blood from stones’ – that is, how to interpret the past through the lithic evidence.

However, although the BAJR guide might give the reader some ballast in terms of dealing with lithics, the guide’s section on terminology and typology is basic, and some colleagues and enthusiasts may feel a need for more detail to allow them to process lithic artefacts collected or excavated in the field, or in old, unprocessed museum collections. To present a lithic assemblage in an unequivocal manner, and to allow it to be compared to other collections, the descriptive terminology and typology must be clear and it must be possible to distinguish clearly between formally related types. Simply put: What defines Object X as belonging to a particular class or type of artefact, and not another?

The purpose of this typological guide is therefore – in contrast to the more general BAJR guide – to present all the prehistoric lithic objects (including all artefact classes, types and sub-types) one might encounter in Britain, and to discuss their definitions: for example, what defines Object X as a tool and not a piece of debitage or a core; what defines a microlith as a microlith and not a knife or a piercer; and what defines a specific implement as a scalene triangle and not an isosceles one? To allow the individual categories of lithic objects to be classified and characterised in detail, it was necessary to first define a number of descriptive terms, which forms the first part of this guide. The main part of the book is the lithic classification section, which offers basic definitions of the individual formal debitage, core and tool types. The intended audience of the volume is students, museum staff, non-specialist colleagues, local groups and lay enthusiasts.

Other lithic typologies have been published in the past, but with a different focus or structure, such as Butler (2005), which offered a period-by-period account describing the various types and sub-types as they developed through time. It is important to emphasise that the present volume does not replace those works; rather it should be seen as a supplement which focuses first and foremost on the definition of formal types by their differing shapes, sizes, retouch, etc. Some older typologies like Evans’ (first edition 1872; second edition 1897) ground-breaking Ancient Stone Implements of Great Britain are also still useful.

It is necessary to emphasise that it will never be possible to produce a definitive typology on lithic artefacts from any country or region as typological work is an ongoing process. As we find new assemblages and individual lithic artefacts or develop new approaches to characterising and interpreting lithics, new meaningful (for example diagnostic) types or sub-types will be defined (e.g., the ‘micro petit tranchets’, see below) or old types will be reinterpreted (some ‘chisels’ are now defined as bipolar cores).

It is also important to underline what this volume is not and what it does not include. A previous attempt to put together a British lithics Glossary or Thesaurus (Healey 2005) was unfortunately never completed. This project was a collaborative effort which, although led by Elizabeth Healey, University of Manchester, involved distinguished lithics specialists such as the late Alan Saville, Caroline Wickham-Jones, Stephen Aldhouse-Green, Frances Healy and many more. In the draft introduction the aims of this glossary were defined as:

- Summarising the main aims of concern in contemporary lithics studies
- Highlighting current analytical practices
- Compiling a comprehensive and fully illustrated glossary of technological and typological terms as used in the UK.

It is this author’s view that the project may simply have been too far-reaching as it attempted, in the most impressive way, to cover too much with the involvement of too many people – we have to realise that no two lithics specialists agree on all points.
The present volume is just a classification system, supported by an introductory section on basic descriptive terms necessary to define the various lithic types. It does not cover:

- Lithic raw materials.
- Reduction techniques. Only a basic introduction is given to allow the classification of cores as platform cores, Levallois-like cores and bipolar cores, etc.
- Analytical approaches like use-wear analysis, intra-site distribution analysis, experimental flint-knapping, technological attribute analysis (usually associated with blade production), ethno-archaeological comparison, etc. These approaches are all well-covered elsewhere in the archaeological literature.
- Northern Irish material is not generally included, as during prehistory this part of Britain tended to follow different typological and technological traditions. As for Ireland more widely, there are clear differences with mainland Britain (Bann flakes and butt-trimmed flakes, for example [Woodman et al. 2006: 118], and some arrowhead types [ibid. 127-155]). Hollow scrapers are included in this volume as the occasional imported piece may be found in south-west Scotland.
- And it was decided to cover only the period from the Late Upper Palaeolithic (LUP) to the Early Iron Age, as Lower and Middle Palaeolithic industries are covered extensively elsewhere in the archaeological literature (e.g., Roe 1981; Pettitt & White 2012).

Chronology

The basic chronological framework applied in this volume corresponds to that defined in Ballin (2017c: 6), and it is presented in Table 1. This chronological schema was developed for use in Scotland, but the author believes that it is also valid (with slight adjustments) in the rest of Britain.

The evidence suggests that the British LUP period is aligned with contemporary industries on the north-west European mainland identified as the Hambourgian/ Creswellian,1 Federmesser-gruppen, and Ahrensburgian techno-complexes, as Britain would have been in touch directly or indirectly with these groups across the then dry Doggerland and the English Channel area (Ballin 2016c; Ballin & Bjerck 2016; Brooks et al. 2011; Sturt et al. 2013).

For approximately half a century, the British Mesolithic has been subdivided into an early and a late part, defined *inter alia* by the dominance of either broad or narrow blades/microliths. It is recommended that the terms ‘broad blade’ and ‘narrow blade’ should not be used as period-defining terms, as blades in various parts of the country differ in terms of width.

Instead, use of the terms ‘Early Mesolithic’ and ‘Late Mesolithic’ is preferred as these emphasise microlith *form* as well as *size*. Although idiosyncratic microlith forms occur at all times through the Mesolithic (cf. Butler 2005), the British Early Mesolithic period is associated mainly with obliquely blunted points and isosceles triangles (and in England a number of other types, such as Horsham points and Honey Hill microliths), and the Late Mesolithic period mainly with scalene triangles, crescents and edge-blunted pieces. As a rule of thumb, the transition between the two Mesolithic periods could be defined as the time when isosceles triangles were replaced, probably gradually over a few hundred years, by scalene triangles. The transition between the British Early and Late Mesolithic periods is defined as in Saville (2008), and supported by Conneller et al. (2016: Figure 8), with the appearance of the first scalene triangles dated to around 8400 cal BC and 8300 cal BC.

A number of Early Mesolithic industries known from England – such as the Deepcar, Horsham and Honey Hill industries (Reynier 2005) – have not yet been identified north of Lincolnshire (Butler 2005; Waddington et al. 2017). Within Britain, the Scottish Early Mesolithic material appears to be related to the English Star Carr group (Clark 1954; Conneller et al. 2018), but overall it seems to follow closely developments in north-west Europe (southern Scandinavia and northern Germany), until maybe a millennium into the Late Mesolithic period, when the Doggerland land-bridge connecting Britain and the European continent finally disappeared (Ballin 2016c; Ballin & Ellis 2019).

It has been suggested to define assemblages with basally modified microliths (i.e., Horsham and Honey Hill points) as Middle Mesolithic, as radiocarbon-dated assemblages with such microliths straddle what is presently known as the Early/Late Mesolithic transition from 8690–8335 cal BC to 6960–6460 cal BC at 68% probability (Conneller et al. 2016: Figure 8). However, it should be borne in mind that some of the radiocarbon-dated sites on which this suggestion is based may be mixed, such as Ashfordby in Leicestershire, which includes broad as well as narrow microliths, as well as a relatively large number of large and small scalene triangles (Cooper & Jarvis 2017).

The British Neolithic and Bronze Age phases are defined on the basis of not only lithic material but also pottery styles, supplemented by metalwork.

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1 The Hambourgian and Creswellian industries have been suggested to represent local variations of the Late Magdalenian complex; e.g., Pettitt & White (2012: 435).
Artefact classification

It is the author’s view that the classification and definition of lithic types, like the classification of all other forms of material culture, is best carried out within a hierarchical system, a classification ‘tree’. In this respect, the author has clearly been guided by his background as a librarian and his experience with Dewey’s Decimal Classification System (Dewey 1876, with later updated versions). This system is based on objective content (‘type’), and its hierarchical structure allows new discoveries to be slotted in at appropriate places.

The Dewey-style hierarchical classification system is based on formal similarities and differences and it is essentially interpretation-free. Some might comment that the names of the various types may be based on interpretation, but although the term ‘end-scraper’ implies that these pieces were used for scraping, general consensus today is that this is a formal and not functional term, and that although these pieces may mostly have been used for scraping, end-scrapers are first and foremost defined as elongated pieces with a mostly convex retouch at one end.

As shown in Figure 1, the author suggests a basic subdivision of lithic objects into the classes: debitage, preparation flakes, cores and tools. Some might suggest the addition of a fifth basic category, by-products, which would include pieces like tranchet flakes (axesharpening flakes), microburins and burin spalls, that is, waste products from the manufacture of axeheads, microliths and burins. This would make technical sense, but the author finds it more helpful in a lithics guide to deal with these artefacts in connection with their complementary pieces: tranchet flakes with axeheads; microburins with microliths; and burin spalls with burins.

The author defines debitage as a category embracing all objects removed from cores in connection with the reduction of the latter (in accordance with Inizan et al. 1992: 84). Some colleagues define debitage as synonymous with waste, but it is the author’s view that this definition is unworkable as it is based on an interpretation. When is a flake or a blade a waste product, a tool blank or an informal tool? The definition of all flakes or blades as either waste, blanks or informal tools would require use-wear analysis to be carried out, which is not always possible, whereas the definition of debitage as all pieces produced in connection with the reduction of a core is interpretation-free. When modified, a piece of debitage then becomes a formal tool. In some cases, analysts may find it relevant to add a category of ‘utilised pieces’ to their general artefact lists (i.e., pieces with macroscopic use-wear; see below) to embrace pieces of debitage which have clearly (i.e., without carrying out microscopic analysis) been used.

Selection of illustrations

Aesthetically speaking, it would have been preferable for the volume’s accompanying illustrations to be all in the same format/style and created by one artist. Good examples of this approach are Vang Petersen’s (1993) book Flint fra Danmarks Oldtid (Flints from Danish Prehistory) where all artefacts were drawn by the gifted Lykke Johansen, and John Evans’ (1897) classic Ancient Stone Implements of Great Britain, where all artefacts were illustrated by John Swain in the form of beautiful engravings.
Figure 1: Hierarchical classification system (classification 'tree') covering British lithic types; it is possible to continuously and indefinitely subdivide the tree. The purpose of this figure is to illustrate the key principle behind hierarchical classification, and it does not include all types mentioned in the typological section.
However, this was not possible for several reasons. Firstly, it would have been exceptionally expensive to employ an artist to carry out this work, and without funding this was not feasible. Secondly, it has taken several years to produce the guide, and it has been the author’s fear that being too ambitious in terms of its topical focus (see above), the involvement of other specialists, or the production/selection of illustrations might sink the project. He therefore chose to illustrate the volume by borrowing existing illustrations, as he did when he produced his monograph *Klassifikationsystem for Stenartefakter* (Classification of Lithic and Stone Artefacts), which discussed the lithic artefact types encountered in southern Norway (Ballin 1996). A large number of the illustrations are therefore from the author’s own publications or borrowed from archaeological units and colleagues he has worked with in the past. Excellent illustrations of some complex and rare types (e.g., tribrachs) were borrowed from Evans (1897), and John Swain’s engravings are precise and aesthetically pleasing. A small number of pieces were redrawn by Leanne Whitelaw.

Due to the way illustrations were selected, it has not always been possible to include a scale in the figures. In these cases, the captions include information as to the greatest dimension (GD) of the artefacts. Also, different artists have followed different standards in terms of indicating the presence/absence of a bulb of percussion on blanks and tools. The following three systems were used by the artists responsible for this volume’s artefact drawings (present/absent): •/ο; +%/ο; and +/• (see Martingell & Saville 1988: 22). It should also be noted that although the standard today is to illustrate flake and blade tools with their proximal end down and microliths with their tip (usually the proximal end) up, some older drawings follow other principles, and some microliths have been drawn with their proximal end down (see for example, the microliths from Jura (Figures 48 and 54).

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2 According to international copyright legislation, it is permissible to use illustrations from volumes 75 years after the author’s death.