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THE LOWER AND MIDDLE PALAEOLITHIC OF BRITAIN, WITH PARTICULAR REFERENCE TO THE PENULTIMATE GLACIATION

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INTRODUCTION : THE QUATERNARY BACKGROUND

On present evidence, the age of the earliest Palaeolithic industries of Britain falls somewhere within the Middle Pleistocene. The Middle and Upper Pleistocene in Britain have their own local stage names, which at present are usually given as follows (see also Mitchell *et al.*, 1973; West, 1977) :

Warmer periods	Colder periods	Quaternary divisions
Flandrian		Holocene
	Devensian	
Ipswichian		Upper Pleistocene
	Wolstonian	
Hoxnian		
	Anglian	
Cromerian		Middle Pleistocene
	Beestonian	
Pastonian		
		(Lower Pleistocene)

Further subdivision is of course possible to some extent, through the recognition of stadials and interstadials in the named glaciations, and of pollen zones within

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the interglacials. It is becoming clear, however, that there are likely to be important discontinuities in this record, and it is accordingly very difficult to offer more than the most tentative correlations between the British sequence and the Pleistocene succession of northwest Europe, which is much better documented in some areas, e.g. the Netherlands. For example, the deposits called 'Cromerian' in the type area, Cromer in Norfolk (West, 1980), relate only to a single interglacial and appear to comprise only the final stages of the whole Cromerian Complex as the term is used in northwest Continental Europe for a period involving at least three major temperate phases and two major cold periods. Again, there is a growing body of opinion in Britain that between the Hoxnian (? = Mindel-Riss, Holsteinian) and the Devensian (= Würmian, Weichselian), there may be *two* interglacials and *two* glacials rather than one of each, though no generally agreed names for the 'missing' glacial and interglacial yet exist.

Equally formidable problems arise when attempts are made to establish correlations between the British Pleistocene succession, based on terrestrial deposits, and the basic record of temperature fluctuations seen in the deep sea cores from various parts of the world, set out as numbered 'isotope stages' (e.g. Shackleton and Opdyke, 1976). One obvious difficulty is our uncertainty as to the position in the British Pleistocene succession of the important palaeomagnetic polarity change from the Matuyama Reversed Epoch to the Brunhes Normal Epoch at c. 0.7 m.y.a., which one would expect to find somewhere before the Cromerian of the type site. The isotopic temperature curves extracted from the deep sea sediments show far more major warm and cold climatic events, let alone minor fluctuations, than can readily be distinguished anywhere in the world on land. The British sequence looks especially deficient, when the brief list of named British stages is set against a generalised Northern Hemisphere palaeotemperature curve.

These major problems of Quaternary stratigraphic correlation are not merely of specialist interest to Pleistocene geologists. Pleistocene deposits on land comprise a record for Palaeolithic archaeologists of the passage of time and also of the succession of changing environments lived in and exploited by Palaeolithic man. In Britain, the difficulty of establishing geological correlations, either internally between different parts of the country or externally between Britain and the Continent, means that it is equally difficult to establish archaeological correlations. It is easy to observe that individual Palaeolithic industries resemble each other or differ from each other, and one may readily describe and quantify the similarities and differences, but when we seek to interpret them we really need to know whether the industries concerned are of the same age or of different ages. How else can we speak with confidence of 'contemporary functional variation', or 'typological and technological change over a period of time'? For such information, we look first to the geological record, and all too often we look in vain. Nor can we derive much assistance from direct chronometric dates, which are extremely scarce in Britain for the Lower and Middle Palaeoli-

thic. We have no volcanic deposits of Pleistocene age, so there are no potassium-argon or fission-track dates. A few uranium decay series dates, obtained from bone samples, have been proposed for British interglacial deposits (Szabo and Collins, 1975). The dating of certain types of speleotherms by uranium series methods looks very promising, but few results are yet available (see however H.S. Green, this volume) and it is unfortunate that Lower and Middle Palaeolithic occupation sites in caves are rare in Britain by comparison with open site occurrences.

Lastly, when we consider the British Palaeolithic sequence, it is important to remember the contemporary geographical situation of Britain itself. We do not know how many times during the Pleistocene Britain was separated from the mainland of Europe by a substantial water barrier, or exactly when viable land-bridges existed. We might suppose that the land-bridge was at its widest during glacial maxima when sea levels were at their lowest - if indeed these two things co-incided precisely. But at such times Britain would have little to offer aspiring settlers; for example, in the Anglian glaciation the actual ice-sheets reached as far south as the outskirts of London and periglacial conditions presumably covered the rest of the country at that time. However, during the interglacials, when conditions were attractive for settlement in Britain, we may suppose that marine transgressions would have been liable to sever the access routes by drowning the land-bridge, at least for a time. There is abundant evidence that human and animal populations did indeed reach Britain and even thrive there, inspite of such obstacles, at various times during the Middle and Upper Pleistocene. However, we would surely be unwise to expect either a continuous record of Lower and Middle Palaeolithic settlement in Britain, or a precise and synchronous repetition in Britain of industries that can be distinguished in northwestern Continental Europe. It is also important to remember that when a land-bridge to Britain was available it could be used both by human groups who had come from the east through Germany and the Low Countries and by others coming from the south through France. At any one time, therefore, the population of Britain might include elements of quite different origins, though the need to adapt to local conditions and local raw materials could lend their industries some degree of superficial similarity. Some observers might give a similar account of the population of Britain to-day.

THE BRITISH ARCHAEOLOGICAL SEQUENCE

LOWER PALAEOLITHIC

Because of the difficulties of correlation already mentioned, it is important to make the fullest use of any individual sites, or groups of sites in one region, where the order of industries can be determined stratigraphically, even if their actual ages may remain obscure. This approach has been adopted by the present writer in a lengthy account of the British Lower and Middle Palaeolithic (Roe, 1981). The best such region is north Kent, around Northfleet, Swanscombe, Dartford and Crayford.

At the famous site of Barnfield Pit, Swanscombe (Ovey, 1964; Waechter, 1968; Waechter *et al.*, 1969; 1970; 1971), the following archaeological sequence can be demonstrated :

Deposit	Industry	
Upper Gravel (soliflucted)	(Derived artefacts only)	
Upper Loam	Acheulian, the handaxe component dominated by finely made ovate forms, showing various refined flaking techniques (fig. 1-d)	
Upper Middle Gravel (soliflucted at the top)	Prolific Acheulian, the handaxe component dominated by pointed forms, often with unworked butts, but well made (fig. 1-c). The hominid fragments occurred just above the junction between the two deposits.	
Lower Middle Gravel		
Lower Loam, capped by a weathering horizon	Scattered small-scale occurrences, comparable to Clactonian, including undisturbed knapping horizons with conjoinable flakes	
Surface of Lower Gravel	Clactonian 'midden' horizon with artefacts and faunal remains in a primary context	
Lower Gravel	Clactonian, scattered through the gravel	Industries with cores, flakes, simple flake tools and choppers (fig. 1-a, -b)
Base of Lower Gravel (soliflucted)	Clactonian, some pieces derived	

The interpretation of the Quaternary stratigraphy at this site is a matter of considerable discussion. The basal horizon of the Lower Gravel is of 'cold' character, presumably attributable to the Anglian late-glacial. The Lower Gravel and Lower Loam have been attributed to the Hoxnian, but so have the Middle Gravels by many authors, though others regard them as younger; it is not clear why there should be two separate and superimposed aggradation cycles for a single interglacial. The solifluction at the top of the Upper Middle Gravel has been attributed to some part of the Wolstonian complex; various authors have regarded the Upper Loam as belonging to a mild phase within the Wolstonian or to the Ipswichian. It is easy to see that much flexibility of interpretation remains and it is by no means obvious how this, the most important

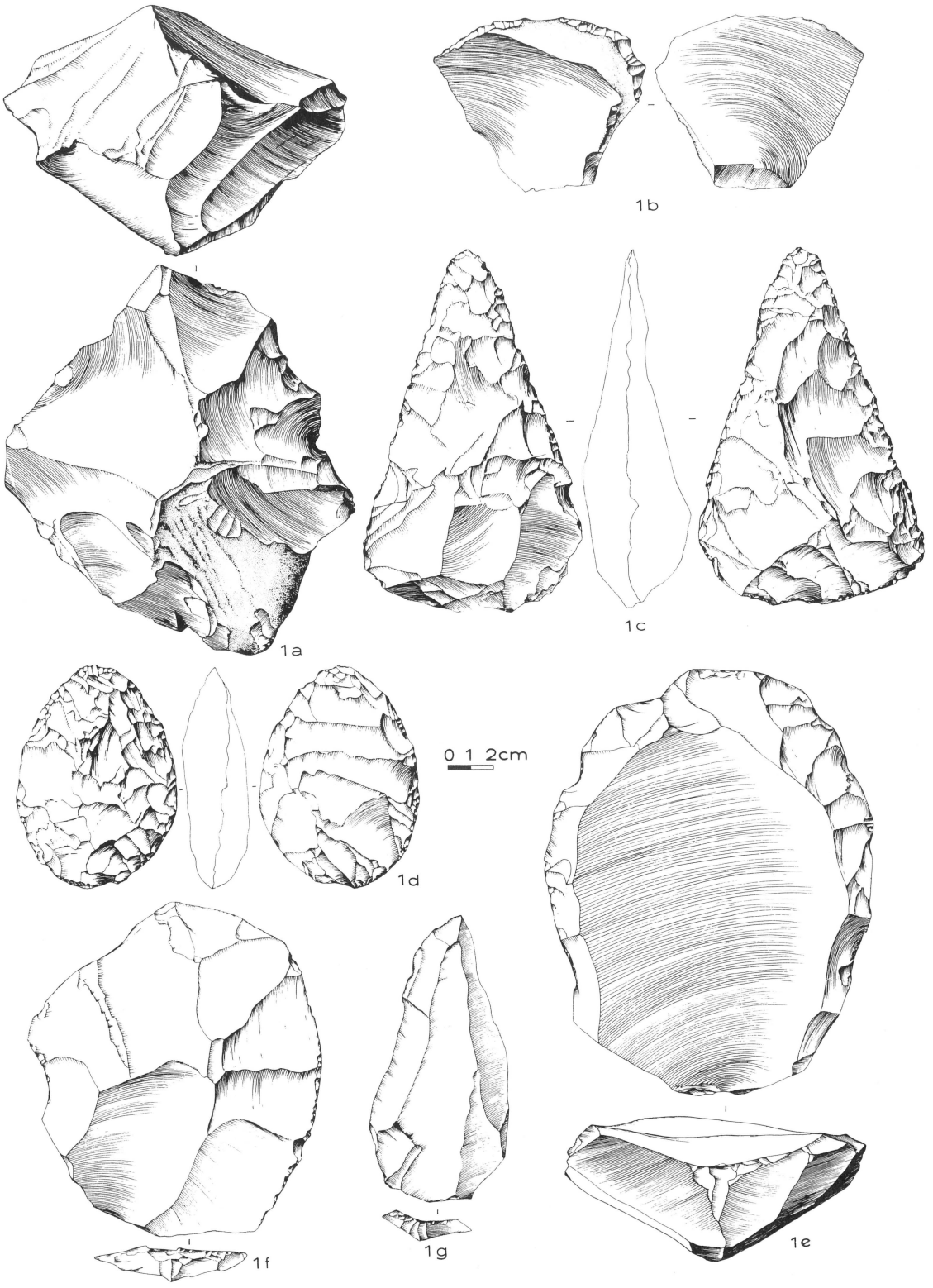

Fig. 1. Selected artifacts from Palaeolithic sites in North Kent. a. Clactonian core, Lower Gravel, Barnfield Pit, Swanscombe; b. Clactonian flake, retouched, same source; c. Middle Acheulian pointed handaxe, found near the Swanscombe hominid remains in the Upper Middle Gravels, Barnfield Pit, Swanscombe; d. Middle Acheulian ovate handaxe, with twisted cutting edge, Upper Loam, Barnfield Pit, Swanscombe; e. Earlier Levalloisian struck 'tortoise core', Baker's Hole, Northfleet; f. Earlier Levalloisian flake, with convergent preparatory flaking of the dorsal surface, same source; g. Later Levalloisian flake-blade, with longitudinal preparatory scars on the dorsal surface, Crayford. All redrawn by Mrs. Y. Baele from various published sources.

single British Lower Palaeolithic site, fits into the framework of the simple-looking Pleistocene succession set out above. However, at least the order in which the Palaeolithic industries occur at Barnfield Pit seems clear enough, and this is what is important in the present context.

Not far from Barnfield Pit is Rickson's Pit, where, in a deposit regarded by some as closely contemporary with the Upper Loam of Barnfield Pit, was found another Acheulian industry rich in ovate handaxes including many twisted forms, associated with slight traces of the use of prepared core technique, including a simple core which could perhaps be called Levalloisian. There are other Acheulian sites of this facies, probably similar in age, in the Swanscombe - Dartford area (Waechter, 1973; Wymer, 1968 : 320-62).

Also nearby is the Ebbsfleet Valley, Northfleet, where an interesting sequence has been observed. The famous Levalloisian working site of Baker's Hole, with thousands of classic Levalloisian flakes, large and boldly fashioned, and many typical cores (fig. 1-e, -f), was situated here. Properly speaking, the term 'Levalloisian' is best applied to a specific prepared core flaking technique, which has a wide range in time. However, occasionally in the British Palaeolithic, industries occur which are so dominated by Levalloisian cores and flakes that they can reasonably be called 'Levalloisian industries'; they are usually associated with special situations in which plenty of high quality flint was available, because the technique, generally speaking, is a wasteful one and is unlikely to be used prolifically where raw material is scarce.

At Baker's Hole, the working floor was covered and disturbed by a thick deposit of Coombe Rock (soliflucted chalk), laid down in periglacial conditions that should represent some part of the Wolstonian glaciation. Into this Coombe Rock is cut the Ebbsfleet Channel, filled with various deposits : a Wolstonian glacifluvial gravel at its base, followed by a sequence with various loessic loams, solifluction horizons and one temperate loam with interglacial mollusca, presumably of Ipswichian age. Artefacts from the Ebbsfleet Channel do not occur in major primary context groups, but they include many Levalloisian flake-blades, so that in this region at least we see an earlier style of Levalloisian industry with heavy oval flakes, showing convergent preparatory flaking, and a later Levalloisian with flake-blades, whose dorsal preparatory scars run longitudinally. The latter industry is also represented a few miles away at Crayford (fig. 1-g), in brickearths to which an Ipswichian date is usually assigned. Similar Levalloisian flake-blades occur in the British Mousterian of Acheulian Tradition, discussed below.

In the Swanscombe - Dartford region, therefore, the Palaeolithic sequence comprises :

1. *Clactonian* (Barnfield Pit, Lower Gravel and probably also Lower Loam)
2. *Acheulian with pointed handaxes* (Barnfield Pit Middle Gravels)
3. *Acheulian with ovate handaxes* (Barnfield Pit Upper Loam, Rickson's Pit and other

4. *Earlier Levalloisian*, with large flakes convergently prepared (Baker's Hole)
5. *Later Levalloisian* with flake-blades, longitudinally prepared (Ebbsfleet Channel, Crayford).

Depending on one's interpratation of the geological sequence, 4 or 5, or both, may be broadly contemporary with 3. So far as the Baker's Hole industry is concerned, this was clearly a manufacturing site where abundant large nodules of flint were being exploited : it would be dangerous to regard the industry as representing a widespread techno-typological stage in Britain, though a few comparable occurrences are known, e.g. at Bapchild, Kent (Dines, 1929). All the other stages listed are also represented at other British sites, in some cases by abundant examples, though they cannot be discussed in the space available here. Unmixed occurrences of Clactonian are rather rare, apart from the prolific discoveries in the type area, Clacton-on-Sea, Essex. All the major British sites are discussed by the present author (Roe, 1981); see also Wymer (1968) for a selective account and Morrison (1980) for a briefer summary.

Some authors have regarded this North Kent sequence as sufficient and definitive for the whole of Britain, but in fact there are other British Palaeolithic industries, not represented in the Swanscombe area, which need to be added to it. First, there is an Early Acheulian stage. Whether the claimed artefacts from Westbury sub Mendip (Bishop, 1975) belong to it is still perhaps uncertain, but at Kent's Cavern, Torquay, Devon, there was certainly an Early Acheulian industry in association with a fauna that should be late Cromerian or, more likely, inter-Anglian in age (Campbell and Sampson, 1971). The main artefacts are large, thick handaxes (fig. 2-a), showing only a crude 'hard hammer' flaking technology. The present writer (1968, 1975, 1981) has suggested that certain open site occurrences are also Early Acheulian, notable Fordwich (Kent), Farnham Terrace A (Surrey) and the worn series from Warren Hill, Mildenhall (Suffolk). The evidence obtained by Singer, Wymer and their colleagues (1973) at the Golf Course site at Clacton, and the evidence of the basal level of the Lower Gravel at Barnfield Pit, Swanscombe, suggest that the Clactonian is present in Britain before the end of the Anglian; such dating evidence as can be gleaned for the Early Acheulian would encourage us to think that it is at least as early as the earliest Clactonian and perhaps a little earlier.

Next, a detailed study of the Middle phases of the British Acheulian indicates that a greater degree of variability is present than we would suspect from the occurrences in the Swanscombe region. Traditionally, the industry with pointed handaxes seen in the Barnfield Pit Middle Gravels, and the industry with ovates found in the Upper Loam, have been regarded as typifying successive stages generally valid for the whole British Acheulian, the differences between the two stages being explained in terms of typological and technological evolution through time. However, consideration of the handaxes themselves might suggest that they are likely to have fulfilled different functions, though it will require the evidence of detailed microwear study before this becomes clear. Would one perform precisely the same tasks with an implement

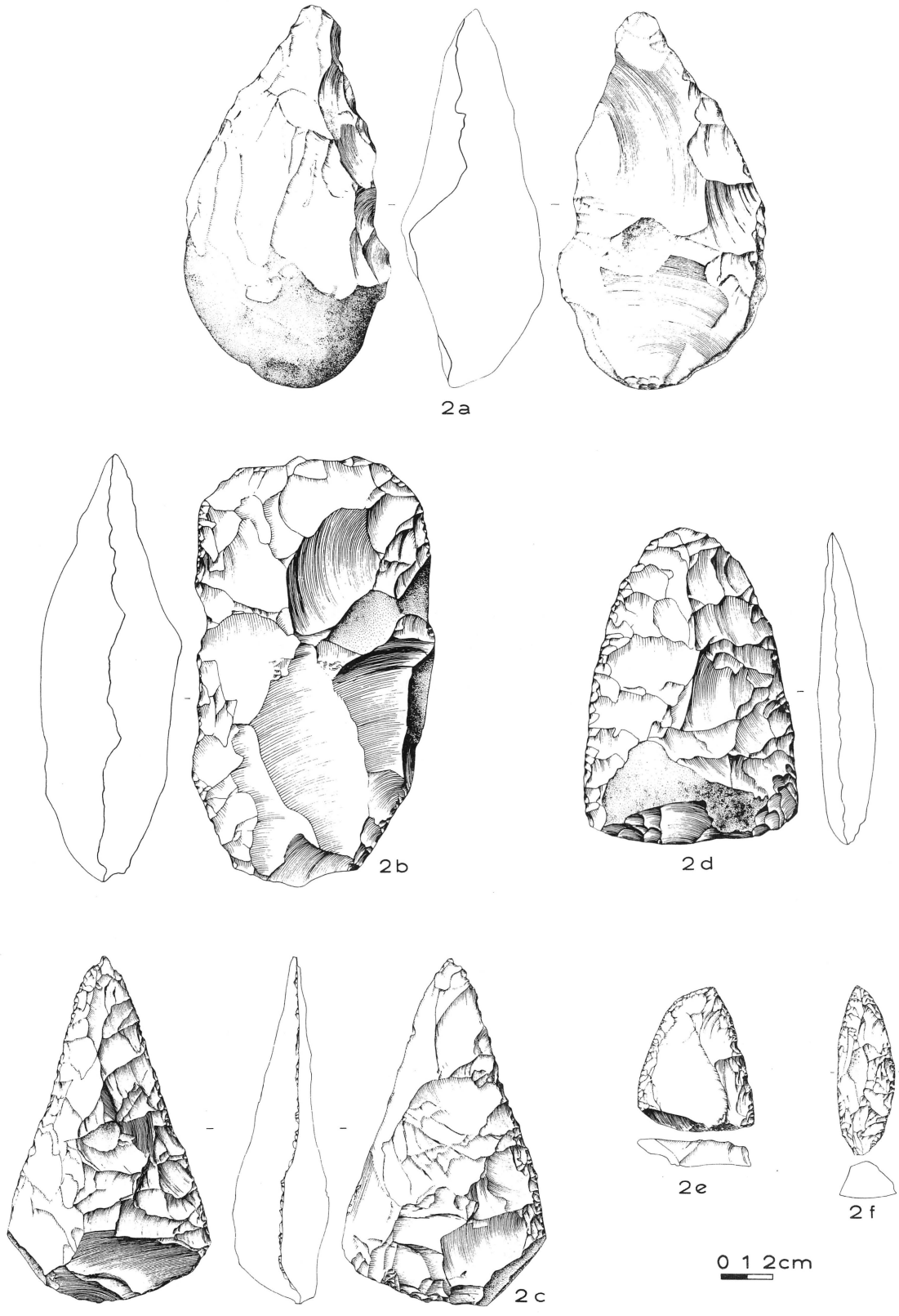

Fig. 2. Selected British Lower and Middle Palaeolithic implements.
a. Early Acheulian crude handaxe, Kent's Cavern, Torquay, Devon; b. Middle Acheulian cleaver, Baker's Farm, Farnham Royal, Buckinghamshire; c. Final Acheulian or Micoquian handaxe, Wolvercote, Oxfordshire; d. Mousterian of Acheulian Tradition '*bout coupé*' handaxe, Southbourne Broadway, Bournemouth, Dorset; e.f. finely made flake tools from the possibly proto-Mousterian site of High Lodge, Mildenhall, Suffolk. All redrawn by Mrs. Y. Baele from various published sources.

offering a heavy, rough butt, a long acute point and straight cutting edges, as one would with a tool of flat oval shape, offering a continuously convex cutting edge? We should also note the tentative conclusion of John Wymer, based on his excavations at Hoxne (Singer and Wymer, 1976) that on occasion the 'ovate stage' may precede the 'pointed stage'. The present writer, after an extensive morphological study of the handaxes from some 38 British Lower and Middle Palaeolithic sites (1968) suggested the existence of a 'Pointed Tradition' and an 'Ovate Tradition', which he saw as overlapping rather than successive in time, each was subdivisible into Groups and to some extent even sub-groups, on detailed morphological or technological evidence. For example, one important variant within the Pointed Tradition is the series of industries in which cleavers (fig. 2-b) play and important part, like Furze Platt, Maidenhead (Berkshire), or Baker's Farm, Farnham Royal (Buckinghamshire) : see Lacaille (1940); Wymer (1968 : 217-27, 239-43). In the Ovate Tradition, some industries have a tendency to more pointed shapes and others to blunt-endedness; the frequency of twisted profiles and of certain flaking techniques also shows marked variation between industries which is not of a random nature. Since we know so little about the dating of many individual sites, it is perhaps most reasonable at present to attribute all these variants to one general 'Middle Acheulian' phase. Some part of the variability may well reflect the traditions of style and workmanship in particular human groups and some may be related to differences in the quality and availability of raw material in different parts of Britain, but it seems likely to the present writer that much will prove ultimately explicable in terms of purely functional considerations.

Thirdly, we can note the presence in Britain of a distinctive type of handaxe industry of late date, a final stage of the British Acheulian, for which the best parallels seem to lie in the so-called Micoquian of Central Europe (Bosinski, 1967; Gábori, 1976) and perhaps also the Micoquian of France - La Micoque, level VI itself, and various occurrences in the North, some of them at the base of the Younger Loess I. The best British example is the Wolvercote Channel site near Oxford (Sandford, 1939; Roe, 1968, 1981 : 118-28). Although a Hoxnian age was suggested for this site by W. W. Bishop (1958), it seems more likely to date from a late stage of the Ipswichian as originally maintained by Sandford, and this would correspond reasonably well with the age of the Continental Micoquian industries, which seem all to belong to the end of the Last Interglacial or the start of the Last Glacial. The handaxes (fig. 2-c) have distinctive pointed shapes, and are made by a characteristic plano-convex technique with a fine standard of finish. Industries of this type are fairly rare in Britain, and there is none in the Swanscombe region.

If these various elements are added to the archaeological sequence of the Swanscombe region, we can now summarize the Lower Palaeolithic of Britain as follows, fuller details being given in Roe (1981) :

Industry	Probable age
CLACTONIAN, with characteristically simple cores and flakes	From Late Anglian to some time in the Hoxnian
ACHEULIAN :	
(a) Early Acheulian, with crude, thick handaxes	Present during a mild phase within the Anglian complex; duration uncertain
(b) Middle Acheulian, many variants within general 'Pointed' and 'Ovate' traditions	Begins in the Hoxnian; present also in the Wolstonian and probably also in the Ipswichian
(c) Final Acheulian (Micoquian), with plano-convex pointed handaxes	Present in the Ipswichian
LEVALLOISIAN :	
(a) Earlier style, with large, convergently prepared cores and flakes	Present by an early stage of the Wolstonian; probably of short duration and used only in special circumstances when raw material was abundant
(b) Later style, with longitudinally prepared flake-blades	Present in the Ipswichian and also the Devensian; similar technology occurs in the British Mousterian

The Levalloisian industries of Britain should not be thought of as representing a separate continuous tradition; they may have been made by quite different groups in special situations as widely separated moments in time. As for the Clactonian industries, much discussion has taken place on the subject of whether they represent some special activity variant within the Acheulian. This controversy has recently been revived by Ohel (1979). As the time of writing, it would be fair to say that there is very little support amongst British archaeologist for the idea that the Clactonian is an integral part of the Acheulian, though some scholars in other parts of the world have expressed approval (see discussion in Ohel, 1979).

MIDDLE PALAEOLITHIC

Mousterian industries of various kinds are the principal components of the Middle Palaeolithic period in northwestern Europe, and they are rich and diverse in France (Bordes, 1961; Tuffreau, 1971) and indeed in Belgium (Ulrix-Closset, 1975).

In Britain, however, Mousterian occurrences are rather scarce and it appears that only one of the well-known West European Mousterian variants is represented : the Mousterian of Acheulian Tradition (M.T.A.), apparently in an early form comparable to that found in northern France at the base of the Younger Loess I (Bordes, 1954). The main reason for the poverty of the British Middle Palaeolithic is doubtless climatic : the colder parts of the Devensian glaciation were severe and it is likely that Britain was unattractive to settlers at the period of maximum development of the Continental Mousterian. In Britain, the main areas where caves exist lie rather far to the north and west, for example in Devon, Somerset, parts of Wales, Derbyshire and Nottinghamshire, which would have been marginal areas for settlement during much of the Devensian. A few rather sparse Mousterian cave occupations do exist in Britain, however, such as Kent's Cavern (Devon), Wookey Hole Hyaena Crags (Derbyshire). In south and east England, various Mousterian open sites are known, such as Little Paxton (Huntingdonshire), Bramford Road, Ipswich (Suffolk), and Great Pan Farm Pit, Shide (Isle of Wight). Another important M.T.A. site existed at Oldbury (Kent), where in Upper Pleistocene times there may have been one or more rockshelters in the sandstone, since destroyed by erosion. The industries at these British M.T.A. sites are characterized by the presence of cordiform handaxes, including the classic so-called *bout coupé* form (fig. 2-d), known also in northwest Continental Europe. There are also well over a hundred isolated finds of typical *bout coupé* handaxes, or of sub-triangular forms that are closely related to them, widely distributed over southern England, sometimes loosely associated with a few other artefacts of Middle Palaeolithic character. Brief accounts of the British Middle Palaeolithic have been given by Collins and Collins (1970), Mellars (1974) and Shackley (1977); a fuller treatment is provided by Roe (1981 : 233-67).

There is some suggestion - for example, at Great Pan Farm (Shackley, 1973) - that the earliest British M.T.A. occurrences may date from before the end of the Ipswichian, but there can be little doubt that the majority, where there is any dating evidence at all, fall within the Devensian. It is also perfectly acceptable to regard some of the flake-blade industries of the 'Later Levalloisian' variant as being technologically Middle Palaeolithic : Crayford, for example, or Creffield Road, Acton. There is no clear sign in Britain of Denticulate Mousterian, Typical Mousterian, or the Quina or Ferrassie variants of the Charentian tradition in their developed form; nor is there any British example of any of those Middle Palaeolithic industries standing right on the threshold of the Upper Palaeolithic which have been reported from various parts of the Old World.

This completes an outline account of the main components of the British Lower and Middle Palaeolithic, but the writer has been asked to give special attention to industries of penultimate glacial age, and these will therefore be considered below.

INDUSTRIES OF 'WOLSTONIAN' AGE

From what has been said above, it will be clear that there are certain problems

in defining the extent of the Wolstonian in time and knowing whether what we at present call the Wolstonian really is the penultimate glacial, or how it might correlate with the Riss, as that term is used in France, or the Saale as distinguished in northern Europe. The list of British industries of 'penultimate glacial age' is therefore somewhat tentative. Some of them seem to be essentially Lower Palaeolithic in their composition, but there are others which seem to foreshadow parts of the European Middle Palaeolithic and might even in some cases be regarded as proto-Mousterian or archaic Mousterian in one sense or another. To those who are acquainted with the industries of Continental Europe at the start of the Upper Pleistocene, this need occasion no great surprise. There are now many examples of technologically advanced flake industries of 'Rissian' or similar age, especially in France (La Micoque levels III and IV, in the Dordogne, for example, or Baume Bonne and several other sites in Provence; Bourgon, 1957; de Lumley, 1969, 1971). Broadly similar occurrences can be seen in Italy and Germany and in other parts of Central Europe.

In Britain too there is the famous but for the moment poorly published site of High Lodge, Mildenhall (Suffolk), where an industry characterized by fine flake-tools (fig. 2-e, -f) occurred in deposits at the edge of a lake apparently of Wolstonian interstadial age. Some of the retouch on the flake tools would not look out of place in a fully developed Charentian Mousterian industry, though the present writer is not aware that Levalloisian or Mousterian primary flaking techniques were used. A monograph reporting major excavations at this site, carried out in the 1960's, and subsequent research, under the direction of G. de G. Sieveking, is at last in the press, and further discussion of the industry must await its appearance. However, various authors have referred to High Lodge as a proto-Mousterian site, on the basis of the old collections makes this a plausible description for the time being. The forthcoming report will doubtless also discuss the age of the deposits at High Lodge on the basis of recent work.

It is difficult to regard La Cotte de Saint-Brelade in Jersey, Channel Islands, as a British site in any but the most technical sense : it surely belongs to northwest France geographically and archaeologically. The results of the long campaigns of excavation by the late Professor C.B.M. McBurney, who died in 1979, are now being prepared as a monograph by Dr. P. Callow and his colleagues at Cambridge. The sequence at this site is long and complicated, but it is clear that the earliest levels are older than 8 metre raised beach, known to be of Last Interglacial age. The initial occupation at La Cotte should therefore belong to the preceding glaciation (McBurney and Callow, 1971), when Jersey would have been accessible from northwest France as a rocky outcrop on an extensive coastal plain. A definitive study of the industry will be included in the forthcoming monograph, but its technology certainly foreshadows the Middle Palaeolithic, if indeed it does not wholly belong to it, with many flake tools and a considerable use of prepared core techniques.

If these industries at High Lodge and La Cotte de Saint-Brelade mark an initial

stage of the Middle Palaeolithic, we can perhaps see others of similar age in Britain which belong to a final phase of the Lower Palaeolithic. The best example would be the Upper industry at Hoxne, Suffolk, of which J. Wymer has given preliminary descriptions (Wymer, 1974; Singer and Wymer, 1976). Here the industry is frankly Acheulian, with some typical pointed handaxes, but there is a strong and important element of flake tools, notably convex side-scrapers, made with far greater care and precision than is usually the case with Middle Acheulian flake tools in Britain - they may be contrasted, for example, with those of the Hoxne Lower Industry. There is little or no sign of Levalloisian technology : the flake tools are made from bold, plain-platform flakes. Perhaps one might draw a general comparison with certain French Acheulian industries : l'Atelier Commont (Bordes and Fitte, 1953), or Orgnac III, in the Ardèche (Combier, 1967), where, in a stratified series of Acheulian industries one may observe a diminution in the importance of handaxes and a corresponding increase in the quantity and quality of flake tools, as part of a local technological progression which sees the emergence of typical Middle Palaeolithic technology.

It seems probable that there are also in Britain during this same period industries which remain classically Acheulian, showing no 'Middle Palaeolithic tendencies', if we may so describe them. To be sure about this, we should need rather clearer knowledge of the age of the deposits that contain such industries. The Upper Middle Gravels at Barnfield Pit, Swanscombe, are a case in point : is this deposit of Hoxnian age, or is it within the Wolstonian complex? The fine Acheulian industries in the Middle Thames Valley like Furze Platt, with pointed handaxes, heavy narrow ovate forms and an interesting component of cleavers, are of 'late Hoxnian or early Wolstonian' age - it is not possible to be more precise, since we do not know the true relationship of the artefacts to the gravels in which they occur. A Wolstonian age also looks likely for a not dissimilar industry at Whitlingham, near Norwich, Norfolk (Sainty, 1927). Summaries of all these sites, and others, with further references, are given by Roe (1981).

Amongst all the sites mentioned in this section, prepared core flaking techniques, so important in the Middle Palaeolithic, are only really common at one, La Cotte de Saint-Brelade which, by virtue of its geographical position, is unlikely to be closely connected with the main Palaeolithic occupation of southern Britain. It is therefore perhaps important to recall here that the great Levalloisian site of Baker's Hole, Northfleet, mentioned earlier, is also apparently of Wolstonian age, as are parts of the Ebbsfleet Channel fill in which Levalloisian artefacts occur. We can therefore at least say that Levalloisian technology was known at this time, even if it was not always employes; prolific use of it, as at Baker's Hole, perhaps depended on the abundant presence close at hand of large flint nodules. Whether the technique was used at all must also have depended on what particular tool types were needed at any particular site, since Levallois flakes are by no means the ideal blanks for the manufacture of all tools.

It will be apparent that several industries of particular interest belong to the time-span of the penultimate glaciation, at present called Wolstonian, in Britain. A substantial amount of recent and indeed current research has been directed towards some of them. One of the most interesting sites currently under investigation is the Pontnewydd Cave at Cefn, Clwyd (North Wales), where work directed by Dr. H.S. Green (see this volume) has vastly increased the artefact total known from the site, which was first excavated in the last quarter of the 19th century, and has profoundly altered our appreciation of its significance. The industry, although it is not certainly the product of only a single occupation, appears to be Lower Palaeolithic rather than Middle Palaeolithic : Acheulian, with use of prepared core flaking techniques, rather than Mousterian of Acheulian Tradition. Flint is rare locally and various other rocks are used, possibly creating certain typological perculiarities. In 1980, some hominid remains were discovered - the only such occurrence in Britain of Lower Palaeolithic age apart from the Swanscombe fragments - and the specialist report on them will be awaited with great interest. Preliminary uranium dates obtained from stalagmite at the Pontnewydd Cave suggest an age for the occupation of between 150,000 and 200,000 years.

CONCLUSION

By way of summarising the second part of this article, we may say that the Penultimate glaciation saw a variety of Palaeolithic industries in Britain, presumably made during its milder phases : they include examples of typical Acheulian, Acheulian developing technologically towards the Middle Palaeolithic, possible proto-Mousterian or archaic Mousterian, and one major factory site specialising in Levalloisian technique. Referring back to the previous section, we may say that the Early Acheulian and the Clactonian had evidently ceased to exist before the Wolstonian began, while those British handaxe industries that we might ascribe to the Micoquian stage in Europe appear to be of post-Wolstonian age. Also younger than the Wolstonian are the industries that specialize in Levalloisian flake-blades, and the whole of the British Mousterian of Acheulian Tradition. In so far as there might be an actual interface between Lower and Middle Palaeolithic in Britain, one would perhaps expect to find in somewhere within the Wolstonian period or soon afterwards, but there is no ultimate need to look for an actual *in situ* technological transition in Britain itself, since occupation there must have been discontinuous, with hunter-gatherer bands of various origins occasionally visiting the British peninsula when conditions were favourable and access possible. As for the Wolstonian itself, there is growing dissatisfaction in Britain with our knowledge and perception of its nature, duration and complexity : the next decade may see the present usage of the name disappear, to be replaced by names denoting a series of distinct cold and warm events rather than one glaciation. Alternatively, the integrity of the Wolstonian may be vindicated. Either way, we should in due course

be better able than we are at present to define our 'penultimate glaciation' in Britain and to suggest correlations with Continental Europe in terms of both Quaternary geology and Palaeolithic archaeology.

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