ST. CATHERINE'S HILL: a Mesolithic Site near Guildford

by G. GABEL

CONTENTS

LIST OF FIGURES

INTRODUCTION

The material presented in this paper is in three sections. In the first of these the site itself is described with its location in geological and topographical context. The material from the site is analysed, with all retouched implements described and illustrated, attention being paid to technology as well as typology. Indices of the various implement forms and by-products are given.

It is hoped that whatever merit the remainder of the paper may lack, the first section at least may achieve something worthwhile, merely by presenting St. Catherine's Hill material in its entirety, and making it available for future research into problems of the British Mesolithic. St. Catherine's Hill material comprises almost 3,400 pieces of struck flint, and the flint count substantiates the collector's claim that it is a complete assemblage. In its size and completeness it is an extreme rarity for a Mesolithic Greensand site. There are many sites known in Surrey and East Hampshire from which Mesolithic implements have been recorded, but material from them, almost without exception, is incomplete, being the result of surface gathering by private collectors during the earlier part of the century. Even when such collections have been placed in museums, the number of implements is usually small and the material obviously non-representative. The difficulties involved in attempting to define such groups as industries with relations to other known British Mesolithic groups are immense. Dr. G. Wainwright in his Ph.D. thesis has a short chapter entitled "Microlithic Industries of Indeterminate Type in Southern England", which is quite simply a list of Mesolithic find sites from the Lower Greensand of Surrey and east Hampshire (including St. Catherine's Hill) and a few outliers, with an explanation that although these sites have definite Mesolithic material which variously does and does not include geometric forms, the material cannot be assigned to any one culture (Wainwright, 1961, 226-9).

As early as 1933, Hooper published the results of his research into Surrey Mesolithic sites, presenting locations, and what was known of the implement content of eighteen find sites (Hooper, 1933, 50-78).

W. F. Rankine worked for almost thirty years on Lower Greensand Mesolithic sites. In his publications he collected together all known references to Mesolithic sites and, having investigated them, gave locations and brief descriptions of the implements involved. In 'A Survey of the Prehistory of the Farnham District', published in 1939, he precisely located twenty-one sites, and gave information concerning the topography, geology and flint content of each site (Oakley *et al.*, 1939, 61-132). When one considers that most of the material which was his point of departure in his research came from old, private collections, sometimes dispersed, or from inexactly provenanced museum collections, and that all was the result of surface collecting, then one cannot but have a profound respect for his scholarship.

In Rankine's publications, the material, for all its frequent paucity was provenanced as far as possible, and described, even if not with the wealth of detail which the present day typologist would desire.

Unfortunately however, the many Greensand Mesolithic sites remain almost entirely unexcavated, the famous exceptions to this state of affairs being the excavations at Farnham initially carried out by Rankine in 1936, and resumed by him in 1937-38 in collaboration with J. G. D. Clark, and the series of excavations at Oakhanger carried out by Rankine between 1952 and 1961. Both sites produced an enormous amount of material and were properly excavated, recorded and published. The material, including all waste flakes, was preserved. From Oakhanger, valuable information was gained from Professor G. Dimbleby's reports on soil profiles, charcoal and pollen.

The only other Greensand Mesolithic site to be excavated and published is that of Abinger Common, by L. S. B. Leakey, in 1951. Weston Wood, roughly three miles east of Guildford, has been excavated but a full report has not yet been published. An analysis of the flints appears in this volume (pp. 00-00).

Rankine excavated seven sites in the 1930s and 1940s, which produced small amounts of material, varying from 1,600 struck pieces of flint including 47 implements from Kettlebury II (Rankine, 1951, 33), to 200 pieces including 7 implements from Trottsford (Rankine, 1953, 16), and of which he published brief, non-illustrated accounts.

St. Catherine's Hill is not an excavated site but a collected one, and as such, lacks a whole range of information which only an excavated site will give. However, as it is almost certainly a complete assemblage and is of reasonable size, it is hoped that its description will prove to have some future value.

In the second part of the paper, comparisons are made between the material from St. Catherine's Hill and that of Farnham. The latter site lies a mere 8½ miles due west of St. Catherine's Hill and very little further in terms of human movement, the two sites being roughly at either end of the natural route formed by The Hog's Back. Attempts are made to discover what the results of the comparisons mean and what inference might feasibly be drawn. This involves close examination of the Farnham material, most especially of the limited range of implements found at St. Catherine's Hill and present at Farnham.

The results of the comparative study are then looked at within the context of other Lower Greensand Mesolithic sites, and of the Horsham industry.

The final section deals with the problem presented by the patinated condition of the St. Catherine's Hill material. It is of interest that these flints are patinated to various degrees, predominantly to an opaque white. Such patination of flint lying sealed within the acidic Lower Greensand soil should be a physical impossibility. Although this aspect was not of interest to early collectors of Mesolithic material, and so is rarely mentioned, there are enough references to show that St. Catherine's Hill is no isolated phenomenon in this respect. The problem is explored, and a solution suggested.

A distribution map is included (Fig. 14) on which the actual find-sites have been located precisely, large scale maps having been used to interpret written

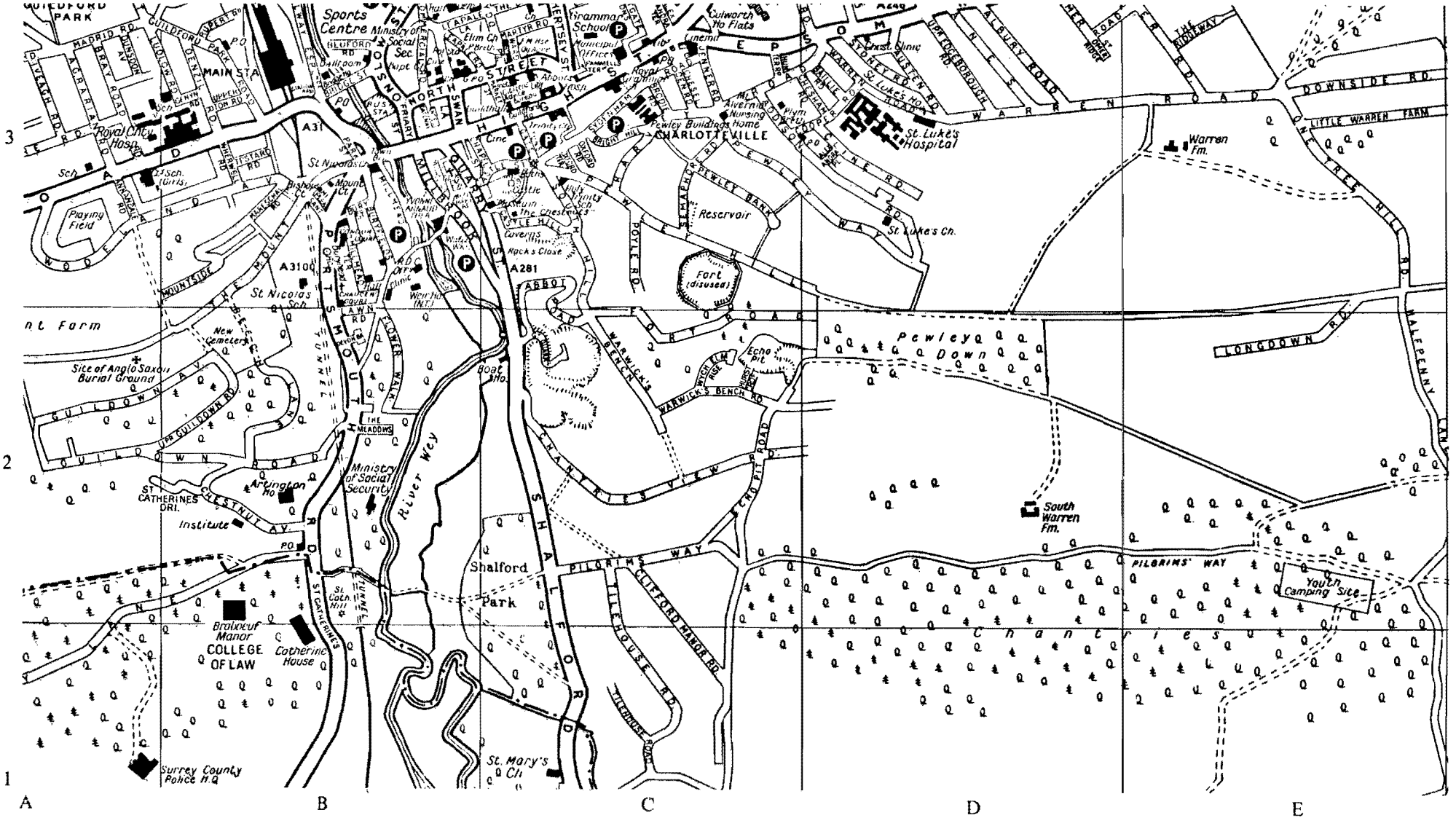

Fig. 1. Map showing position of St. Catherine's Hill, south of Guildford, square B2. From the Geographia Map of Guildford. Scale 4. 5 inches to 1 mile.

references in the majority of cases where grid references or co-ordinates are not available. The exceptions are the Horsham group, where general site references only are available, and those sites whose material comes from a widespread area and which are discussed in the second section.

THE SITE

St. Catherine's Hill lies less than one mile south of the centre of Guildford, between the A3100 road and the river Wey (SU 994483) (Fig. 1). It is a small hill, reaching 217 feet OD. Its eastern edge forms a bluff, eroded by the Wey (see Fig. 2). The main railway line from Guildford runs beneath the eastern part of the hill. To the north-west of its lower slopes the land rises rapidly to form the eastern edge of the Hog's Back, reaching 453 feet OD only one mile from the site. To the north of St. Catherine's Hill is the gap in the chalk ridge through which flows the Wey, and where Guildford has developed. On the Geological Survey Sheet 285 St. Catherine's Hill appears on the Folkstone Beds of the Lower Greensand.

Present knowledge indicates that three factors affected Mesolithic settlement in this region. Firstly, an apparent preference for well-drained soils; thus a distribution map of Mesolithic sites (Fig. 14) shows an almost exclusive adherence to the Lower Greensand. Exceptions such as Farnham (Fig. 14 no. 22) and some nearby sites (Fig. 14 nos. 3, 12, 27, 50, 55, 56; 11, 29, 48) lie either on terrace gravels deposited by the river Blackwater prior to the capture of its headwaters by the Wey, or on gravels overlying Eocene deposits. Three Chiddingfold sites (Fig. 14 nos. 14-16), well within the Wealden clay, are each on very localized, sandy outcrops (Halahan, 1927, 239).

A second factor determining Mesolithic settlement was the availability of water, and a close association exists between Mesolithic sites and rivers (see Fig. 14). Where rivers are not in the immediate vicinity of a site, the relevant 6-inch O.S. map almost invariably reveals a stream. The several strike and dip faults between Farnham and east of Guildford (see Fig. 13) give many areas where Gault clay is brought into conjunction with the chalk. The resultant permanent springs, and the many rivers, made the whole area attractive to Mesolithic groups. St. Catherine's Hill is situated overlooking the Wey and close to the junction of a tributory, the Tilling Bourne.

A dominating feature of the geology of Surrey is the chalk outcrop running west and east. Between Farnham and Guildford it is narrow, varying from a few hundred yards in width near Farnham to roughly a mile near Guildford. As well as providing easy means of movement which possibly was of relevance to Mesolithic groups, the chalk, in its upper bends only, contains layers of reasonably good tabular and nodular flint. As the beds are inclined to the north, the flint is easily accessible. This was of undoubted importance in the settlement of the area. West of Farnham and east of Guildford the chalk outcrop is frequently masked by later deposits, and the Mesolithic distribution (Fig. 14) indicates the effect on settlement.

It can be seen that St. Catherine's Hill is ideally situated: it is on the Lower Greensand, close to plentiful water and flint supplies. In fact, immediately south of Guildford the conjunction of the chalk and Lower Greensand marks a fault line, the down-throw side being to the north (see Figs. 13, 14). Due to this faulting the Gault clay and Upper Greensand are absent for almost one mile. This would have made the area especially attractive to Mesolithic groups, which avoided the clay, preferred the Lower Greensand, and utilised the chalk resources. St. Catherine's Hill lies within this one mile area, on the Lower Greensand, less than half a mile from the Upper Chalk.

Additionally, St. Catherine's is a hill site. There are several Surrey Mesolithic small hill or promontory sites usually, but not invariably, above water. The reason for the hill siting cannot be known, but these are sites whose finds (again all surface material, and therefore one cannot be too adamant) indicate perhaps a small occupation but more certainly a limited range of implement types. It might be hypothesized that such sites were hunting bases, that the hill-top situation could have given opportunity for sighting quarry; but this can remain no more than an hypothesis. It is worth noting that material from these sites is almost always found below the brow of the hill, in a sheltered position. Examples of such sites are: Barford, Caesar's Camp, Chapel Field, Crooksbury Summit, Heath Brow, Monk's Walk, Moor Park A and B, Rock House, Snailslynch, and Tilford District (see Fig. 14).

THE FLINT INDUSTRY

The St. Catherine's Hill material was collected several years ago by a Mr. Robert Grace of Herne Bay, and in 1962 was acquired by the British Museum. The earliest reference to the site is its appearance in 1951 on a map of West Surrey Mesolithic sites (Rankine, 1951, Fig. 13, no. 70), but there is no further information in this, or any publication, relating to the site.

With the collection comes the information that it is a complete assemblage, and a note written by Mr. Grace which reads: 'All were found in a level approximately six inches from the surface to a depth of eighteen inches, on a sandy hill just outside Guildford at a small village called St. Catherine's about fifty yards off the main Brighton road, and within a few yards of the southern outlet of a tunnel on the main railway Guildford to Brighton.' In the absence of more precise information, which is not available, presumably 'within a few yards of the southern outlet of a tunnel' refers to the lower part of the hill (see Fig. 2).

The St. Catherine's Hill material was probably originally a mid-brown colour, on evidence from some of the less-patinated pieces. The majority of the flints are patinated to a bluish-white, grey white, and frequently to a completely opaque white. Additionally, many of these patinated pieces show grey surface mottling indicating iron-staining. There is also surface discolouration and crazing in 247 pieces (240 of which are waste flakes), which indicates contact with fire. The flint has frequent brown cherty inclusions, and flaws, which evidently caused difficulties in knapping. There are cores of medium size, abandoned after repeatedly unsuccessful attempts at removing hinge-fracture overhangs caused by inclusions. Generally the standard of flint-working is excellent (the opinion of Dr. M. Newcomer of the University of London Institute of Archaeology). The flints are fresh and unrolled, with edges unabraded.

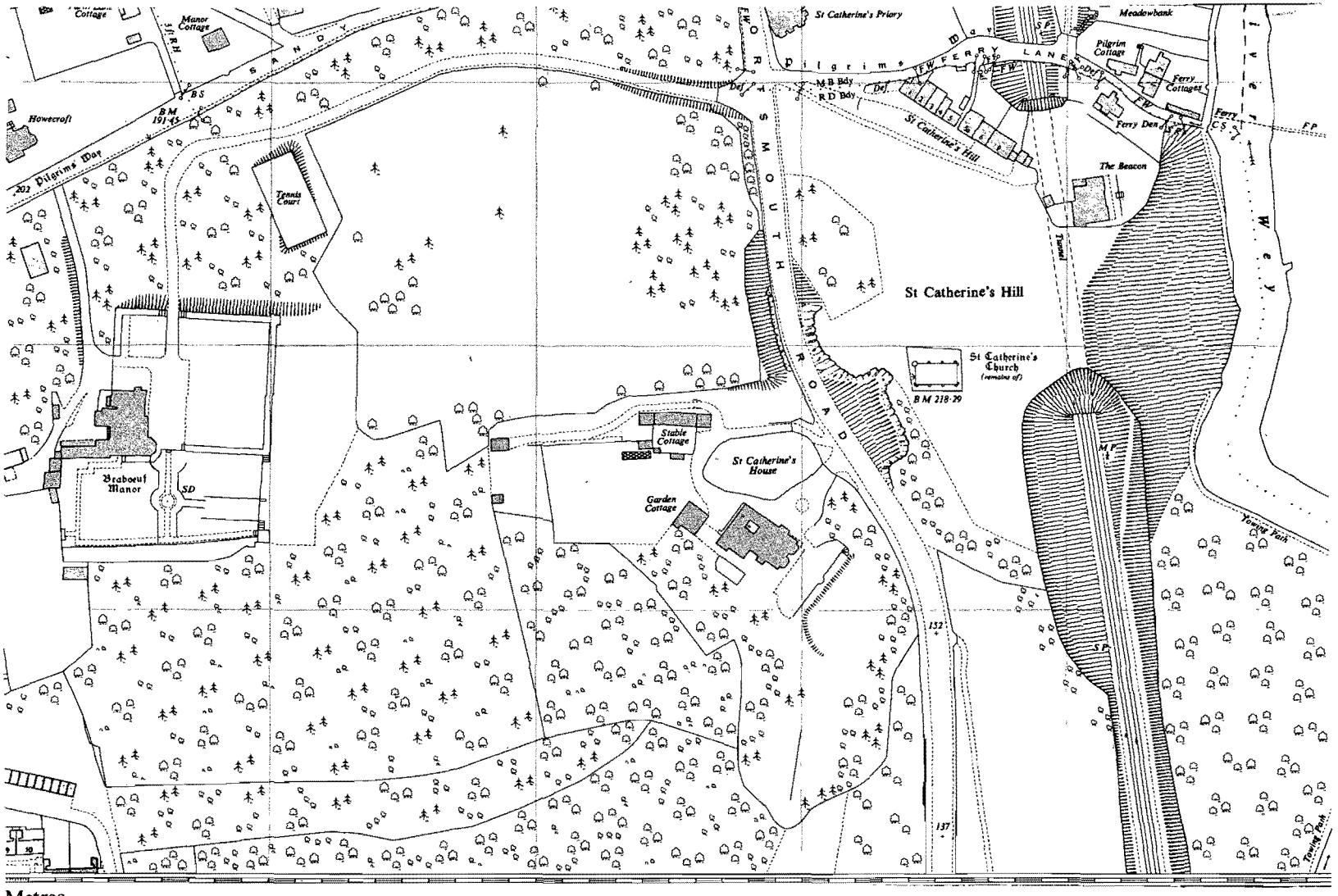

Fig. 2. St. Catherine's Hill. Precise location of find-spot not recorded. Refer to p. 7 of text.
From the Ordnance Survey Plan of St. Nicholas Ward, Guildford

The general composition of the industry is as follows:—

Finished implements		
Microliths	38	
Scrapers	7	
Notched blades	5	
Truncated blades	2	
Awls	7	
Fragments of unidentifiable types	4	
TOTAL		63
Utilised waste flakes and blades		
With definite retouch	25	
Utilised only, no retouch	11	
TOTAL		36
By-products		
Waste flakes and blades	3, 183	
Cores	66	
Core-rejuvenating blades	21	
Core platform-rejuvenating flakes	12	
Microburins	16	
TOTAL		3, 298
TOTAL ASSEMBLAGE		3, 397

By-products form 97. 1% of the assemblage, indicating its completeness. The percentage accords well with Farnham (Clark and Rankine, 1939, 72), where Pit I gave 97. 2% by-products, and the average for all five locations was 96. 4%. Similar results came from Oakhanger: sites V and VII produced 95. 7% by-products (Rankine, 1960, 248).

In the following morphological description of the implements and by-products, not only is J. G. D. Clark's system of microlithic classification used (Clark, 1934b, 52; 1939, 61; 1955, 3), but also some more recent terms of reference of the French typologists F. Bordes, D. de Sonneville-Bordes, J. Perrot and J. Tixier.

One feature which seemed of importance in the comparative study of St. Catherine's Hill microliths was the shape of the original bladelet, particularly that of the distal end; this is not a feature of Clark's classification; note the various bladelet shapes of Clark's type A (Clark, 1934b, 57); the French terminology was found to be helpful here. However, it would not be realistic to describe a collection of British Mesolithic material within the French typologists' framework, and for purposes of present comparison with other British material, Clark's terms are frequently referred to.

R. Jacobi is carrying out research which will produce a new system of classification for British Mesolithic material, but a similar attempt would be beyond the purpose of this paper.

Dr. G. Wainwright prefers a simplified system of microlith classification compared with that originally proposed by Clark (Wainwright, 1961, 63), and suggests that for obliquely blunted points (the most common Mesolithic implement) it is sufficient to separate only those with, and those without, opposed distal retouch. This excludes the distinction made by Clark (Clark, 1934b, 56) between points whose retouch forms an angle with the unretouched part of the same edge (e.g. Fig. 3, nos. 16-18), and those points without such an angle (e.g. Fig. 3, nos. 1-6). The variants are separated by F. Bordes and J. Tixier, who term the former tool a truncated blade or bladelet, and the latter a partially-backed blade or bladelet (Bordes, 1951, 6; Tixier, 1963, 127). For present purposes it was found necessary to maintain this distinction, which seemed to have relevance when comparing St. Catherine's Hill microliths with those of Farnham and other Lower Greensand sites. An Appendix lists the few terms of the French typologists utilised here, with their definitions (p. 100).

All percentages quoted are correct to the first decimal place.

With regard to the flint illustrations, a line at the base of an implement indicates the axis of percussion (wherever this is ascertainable by visibility of ventral ripples); a filled circle indicates the presence of the bulb of percussion, an open circle its absence. One convention of the French typologists has been adopted: that of illustrating each implement with its bulbar end downwards.

Microliths

There are 38 microliths, including identifiable fragments. Microliths therefore comprise 38. 3% of the total implements; or 43. 2% excluding the non-retouched utilised blades and flakes; or 60. 3% excluding all the utilised blades and flakes.

Some of the 4 unidentifiable implement fragments may be microliths, but as this is not certain, these have been included in the general tool count only.

The length of unbroken microliths ranges from 19. 5 mm to 32. 8 mm.

The microlith forms:—

Obliquely blunted points

1. Obliquely blunted points formed by a partially-backed bladelet, whose distal end is unretouched and naturally pointed (Clark's A2a).

   6 complete (Fig. 3, nos. 1-6).
   4 distal fragments (Fig. 3, nos. 7-10).

2. Obliquely blunted points formed by a partially-backed bladelet, whose distal end is unretouched and naturally rounded (Clark's A2a).

   4 complete (No. 11 chipped slightly at base) (Fig. 3, nos. 11-14). 1 fragment (proximal, but its proportions assign it definitely here) (Fig. 3, no. 15).

3. Obliquely blunted points formed by truncated bladelets whose distal end is unretouched and naturally pointed.

   3 complete (Fig. 3, nos. 16-18).

4. Obliquely blunted points formed by partially-backed bladelets, whose distal end is naturally pointed, and which have additional, very light retouch on the left edge, beginning at the distal tip (Clark's A2b).

   1 complete (Fig. 3, no. 19).
   2 distal fragments (Fig. 3, nos. 20-21).

5. Proximal fragments of obliquely blunted points formed by partially-backed bladelets, which lack evidence of distal shape or additional retouch.

   4 (Fig. 3, nos. 22-25).

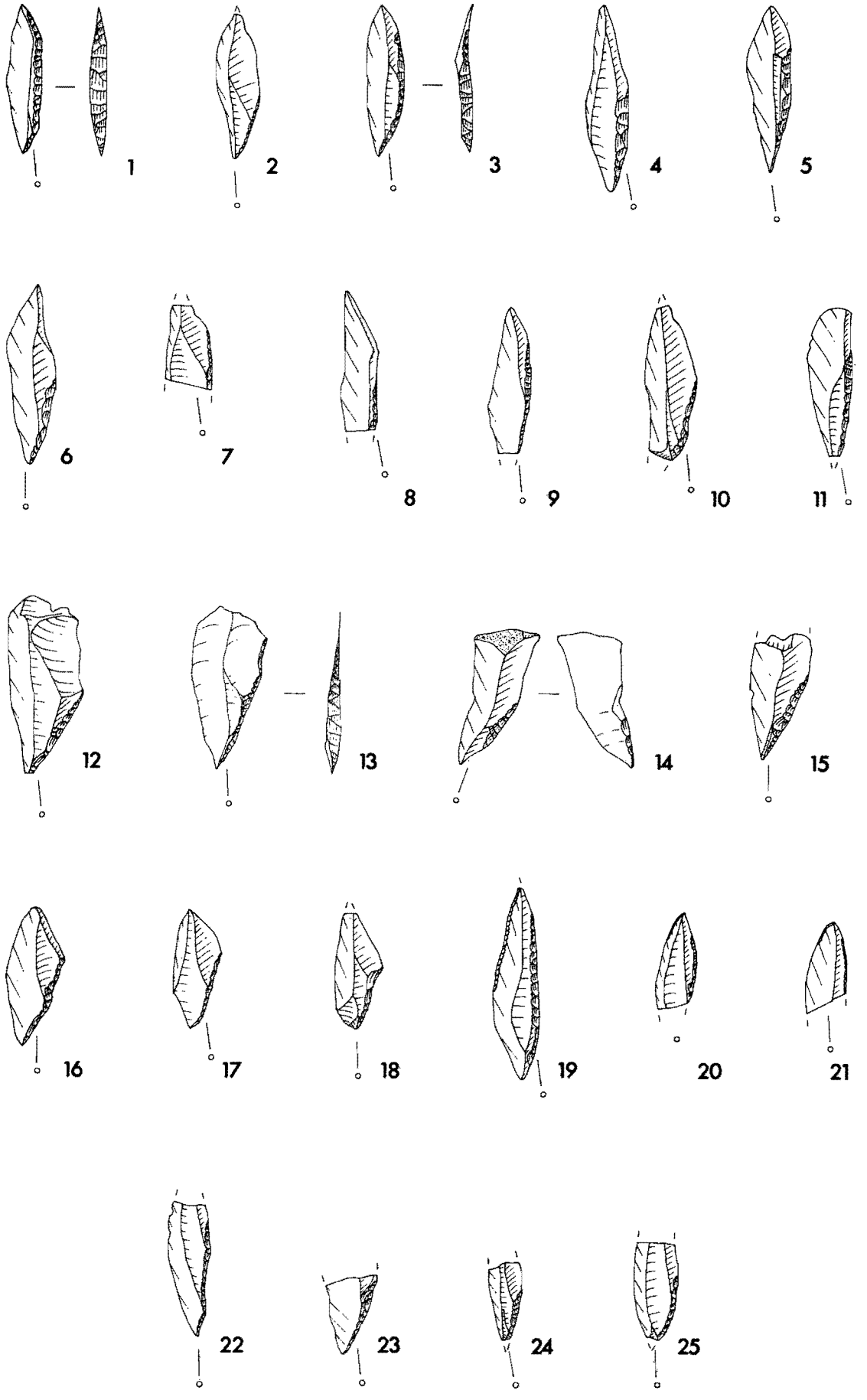

Fig. 3. St. Catherine's Hill. Microliths. Scale 1 : 1.

Backed bladelets

Bladelet blunted along the whole of one edge (Clark's B).

1 distal fragment (Fig. 4, no. 1).

Triangles

True triangle, with two edges completely blunted (Clark's D1a).

1 complete (Fig. 4, no. 2).

Sub-triangle, with one edge incompletely blunted (Clark's D5).

2 complete (Fig. 4, nos. 3, 4).

Hollow-based points

Hollow formed by direct retouch at the distal end (Clark's F2ai).

2 complete (Fig. 4, nos. 5, 6).

Tanged points

Tang formed by direct retouch at the distal end (Clark's G).

2 complete (Fig. 4, nos. 7, 8).
1 distal fragment (Fig. 4, no. 9).

In each of the above microliths, the blunting retouch is on the right edge. The retouch on the obliquely blunted points is interesting: it begins at the proximal tip as direct abrupt retouch, forming a durable point, it then grades into semi-abrupt retouch, which in turn, in points such as Fig. 3, nos. 1-6, grades imperceptibly into the unretouched portion of the edge. The amount of retouch varies greatly: Fig. 3, no. 2 has 12 mm of retouch, i.e. about two-fifths of the edge; Fig. 3, no. 1 has 24. 5 mm of retouch, which is eight-ninths of the edge.

Miscellaneous fragments

1. 2 proximal fragments with abrupt retouch on the right edge, one having additional light retouch at the distal end of the left edge. Possibly oblique points or backed bladelets (Fig. 4, nos. 10, 11).
2. Distal fragment made on a naturally pointed bladelet; some light retouch on the right edge, beginning at the distal tip (Fig. 4, no. 12).
3. Distal fragment made on a naturally pointed bladelet, light alternate retouch beginning at the distal tip (Fig. 4, no. 13).

SUMMARY OF MICROLITHS

Implement	*Number*	*% of microliths*
Obliquely blunted points	25	65. 8
Backed blades	1	2. 6
Triangles and sub-triangles	3	7. 9
Hollow-based points	2	5. 3
Tanged points	3	7. 9
Fragments differing variously from the above	4	10. 5

Microburins

The number of microburins (16) is less than the number of microliths, but this is, without exception, a feature of Mesolithic sites, especially from complete assemblages (e.g. Farnham: 360 microburins and 690 microliths; Oakhanger V: 308 to 1, 281; Abinger Common: 11 to 19). At St. Catherine's Hill every microlith has been blunted along the right edge while every microburin without exception has been notched on the right edge. Also, each microlith from St. Catherine's Hill has had the bulb of percussion removed and all of the microburins are proximal; there is not a single distal microburin. (Six of the microburins are illustrated: Fig. 14, nos. 14-19). It would seem probable that each of the St. Catherine's Hill microliths was made by the microburin notch technique despite the usual low microburin to microlith ratio.

Macrolithic implements

Scrapers

1. 4 single end-scrapers on primary flakes (Fig. 5, nos. 1, 3, 4, 6); dorsal surface retaining much cortex; bulb intact. Hinge-fracture on left edge of no. 4 occurred prior to removal of this flake from core. Sonneville-Bordes' no. 8 (Sonneville-Bordes, 1954, 330).
2. 1 single end-scraper on a blade (Fig. 5, no. 2); broken; bulb intact. Sonneville-Bordes' no. 1 (Sonneville-Bordes, 1954, 328).
3. 1 scraper on a retouched flake or blade (Fig. 5, no. 5); broken. Sonneville-Bordes' no. 3 (Sonneville-Bordes, 1954, 328).
4. 1 fragment of a small, perhaps discoidal scraper (Fig. 5, no. 7); well-made; thin section

Notched blades

5, including fragments whose fracture is not that of a microburin (Fig. 5, nos. 8-12). These are a common feature on Mesolithic sites and it is frequently suggested that they represent an abandoned attempt at obtaining a microlith by microburin technique, but there is a probability that the notched blade may be a tool in its own right. F. Bordes classifies it separately, noting that it can grade into the smaller hollow scrapers (Bordes, 1961, 35). Here he is considering Palaeolithic material, but J. Tixier, dealing with Epi-Palaeolithic material, also separates notched blades (Tixier, 1963, 21); one of those he illustrates (Tixier, 1963, Fig. 43, no. 2) is an exact parallel to many British Mesolithic pieces.

It is of interest to note that one of the St. Catherine's Hill examples (Fig. 5, no. 12) shows two notches, one made by direct retouch on the right edge, the other by inverse retouch on the left edge. Although microburins notched on the left edge are a minor, but regular feature of Lower Greensand Mesolithic sites (e.g. 7. 6% of the Farnham microburins), the retouch is always, without exception, direct; it is never inverse. Also St. Catherine's Hill has not produced one microburin notched on the left, nor one microlith blunted on the left edge. Therefore, on two counts, an explanation of Fig. 5, no. 12 as an intermediate microburin can be dismissed, and the piece increases support for the separate status of notched blades.

Truncated blades

2 complete (Fig. 6, nos. 1, 2); truncation formed by oblique retouch of the distal end; bulbar end intact. A common feature of British Mesolithic assemblages.

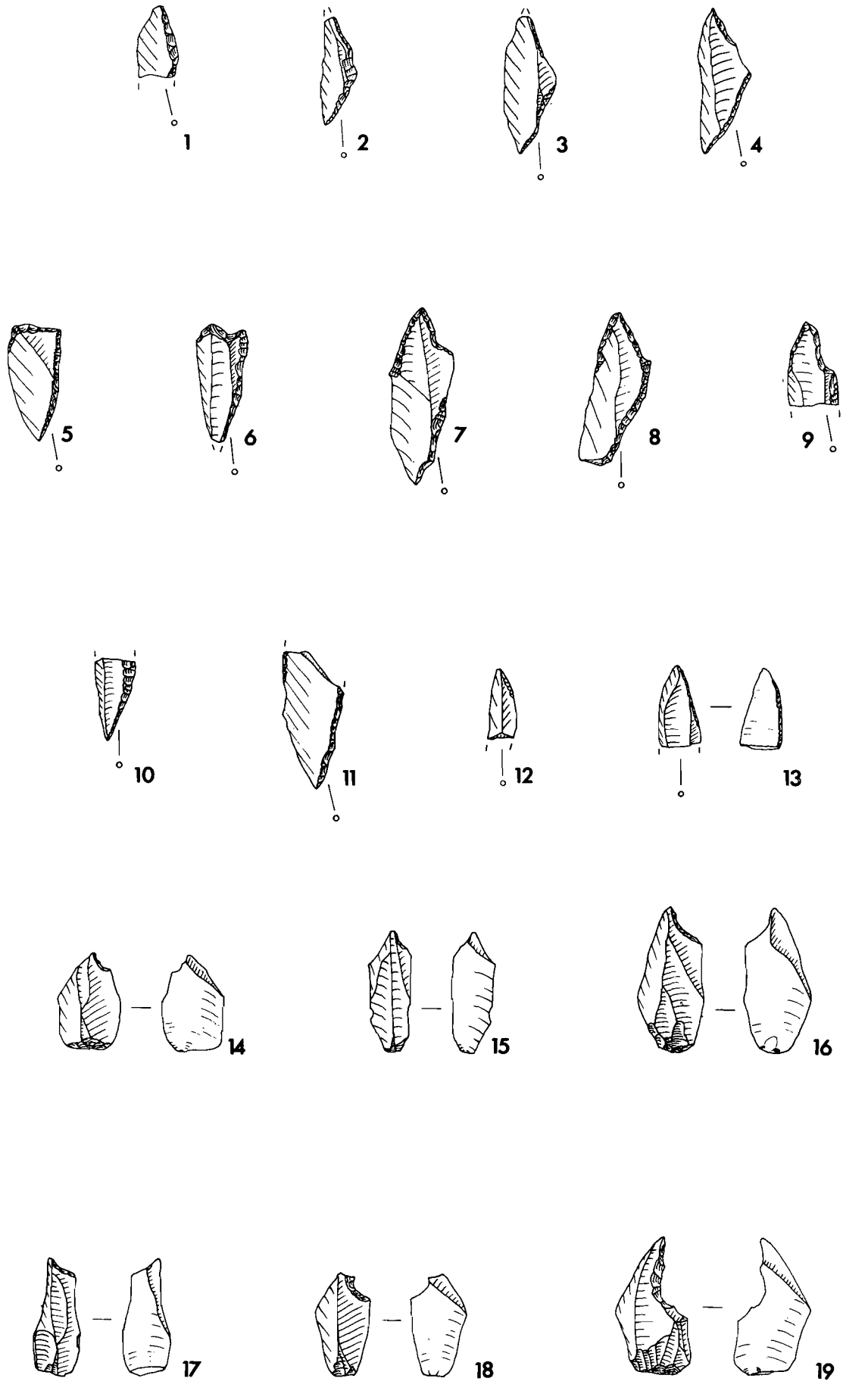

Fig. 4. St. Catherine's Hill. Nos. 1-13 Microliths. Nos. 14-19 Microburins. Scale 1:1.

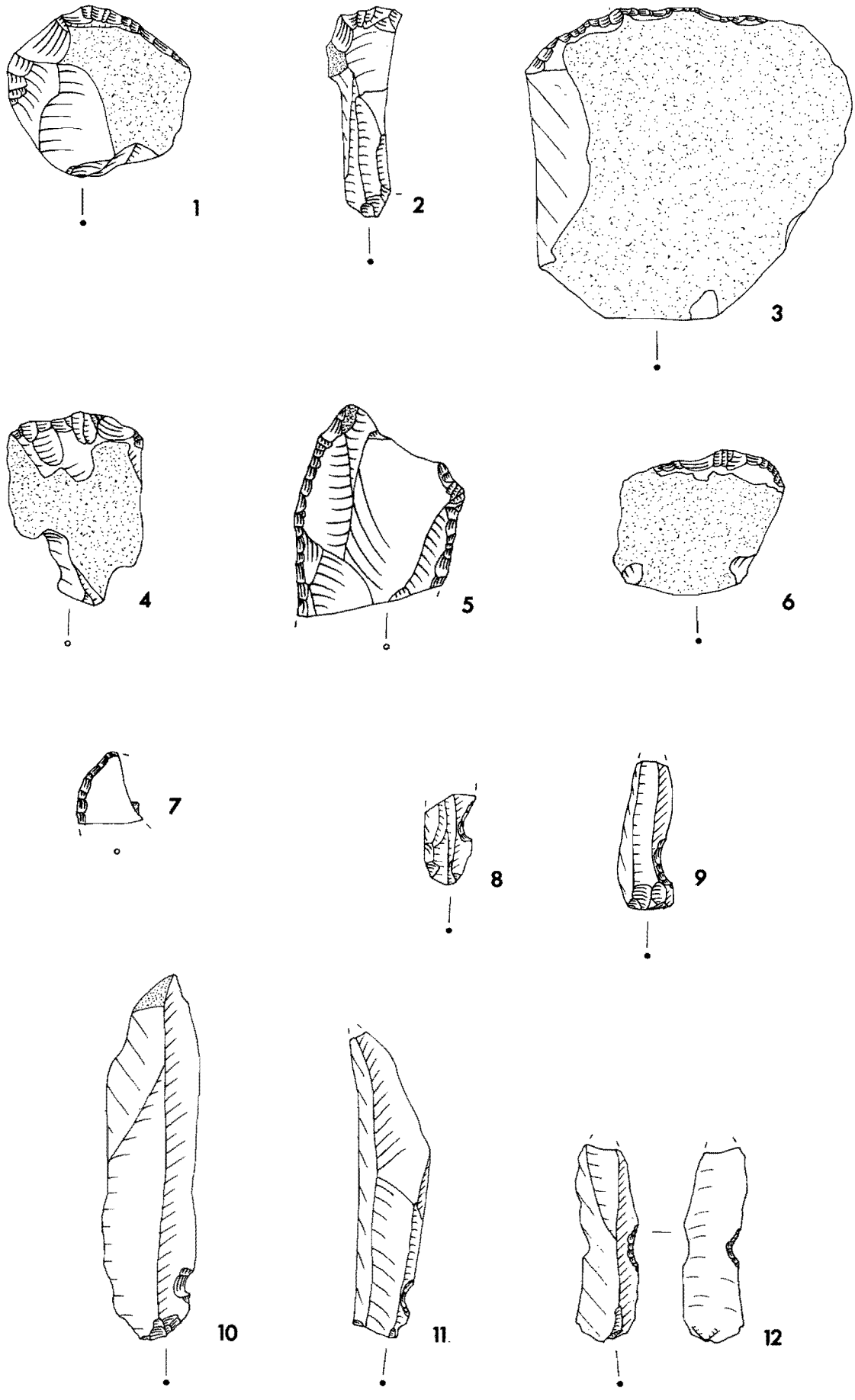

Fig. 5. St. Catherine's Hill. Nos. 1-7 Scrapers. Nos. 8-12 Notched blades. Scale 1:1.

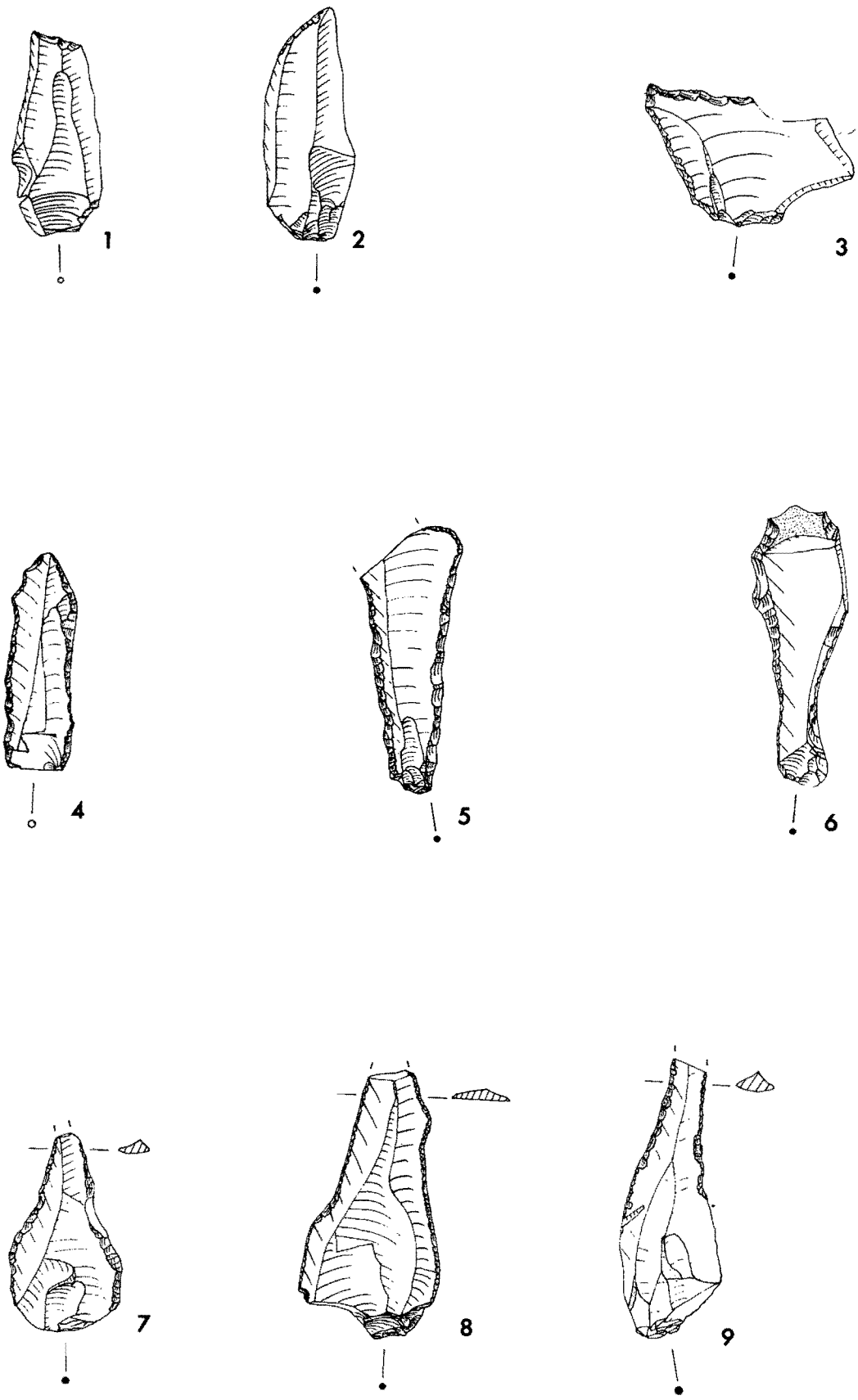

Fig. 6. St. Catherine's Hill. Nos. 1-2 Truncated blades. Nos. 3-9 Awls. Scale 1 : 1.

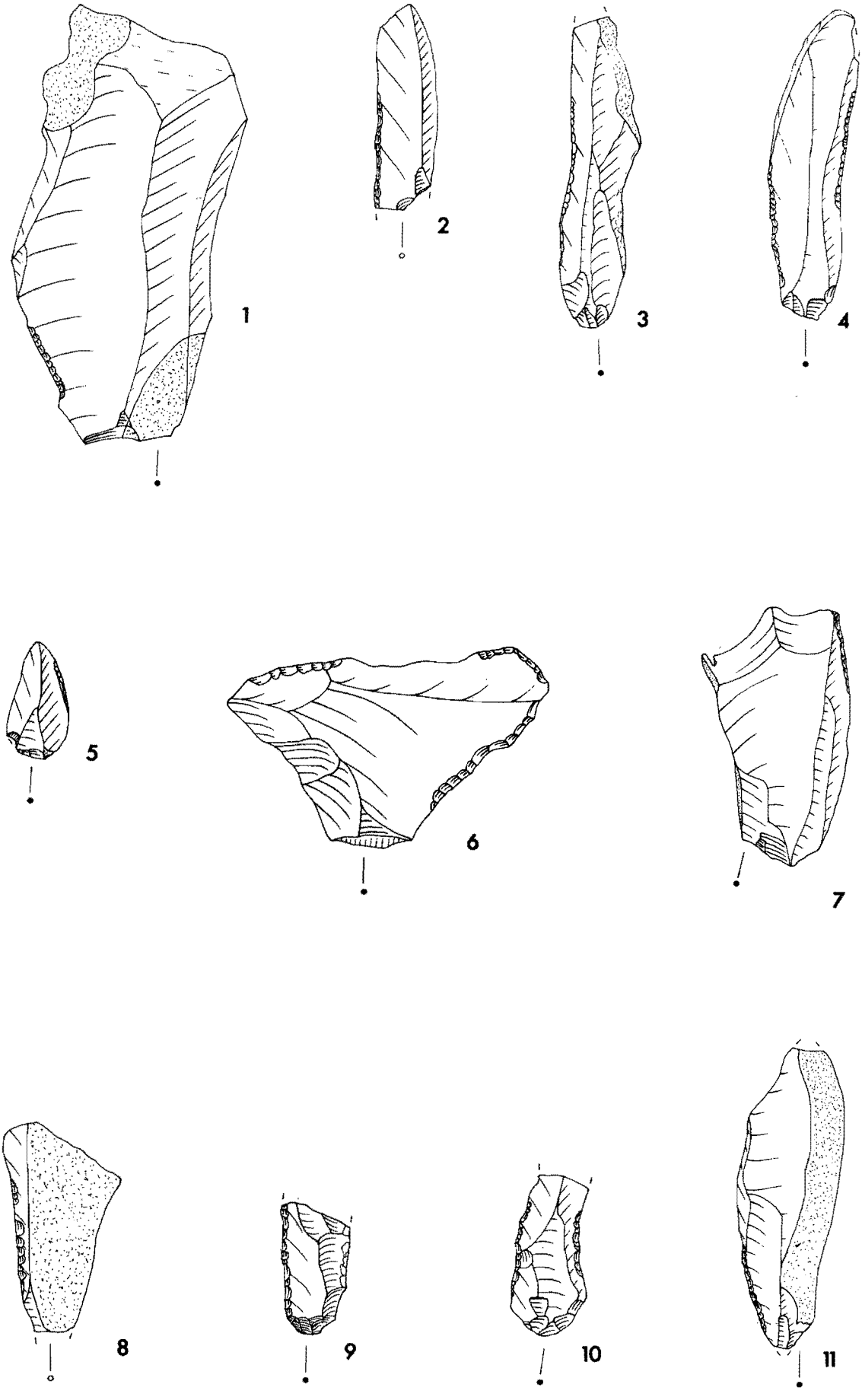

Fig. 7. St. Catherine's Hill. Blades and flakes. Direct retouch. Scale 1 : 1.

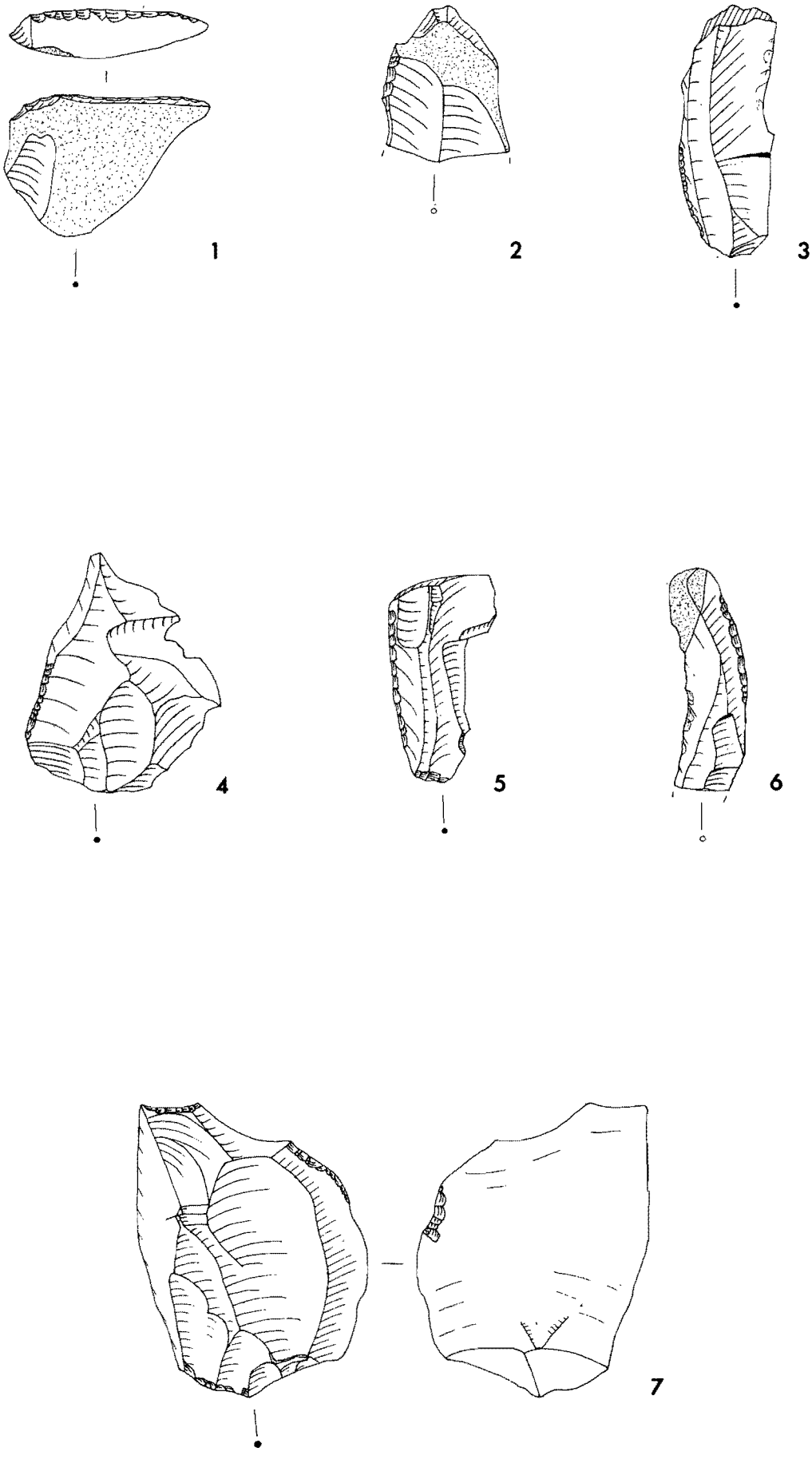

Fig. 8. St. Catherine's Hill. Blades and flakes. Nos. 1-6 direct retouch. No. 7 alternating retouch. Scale 1:1.

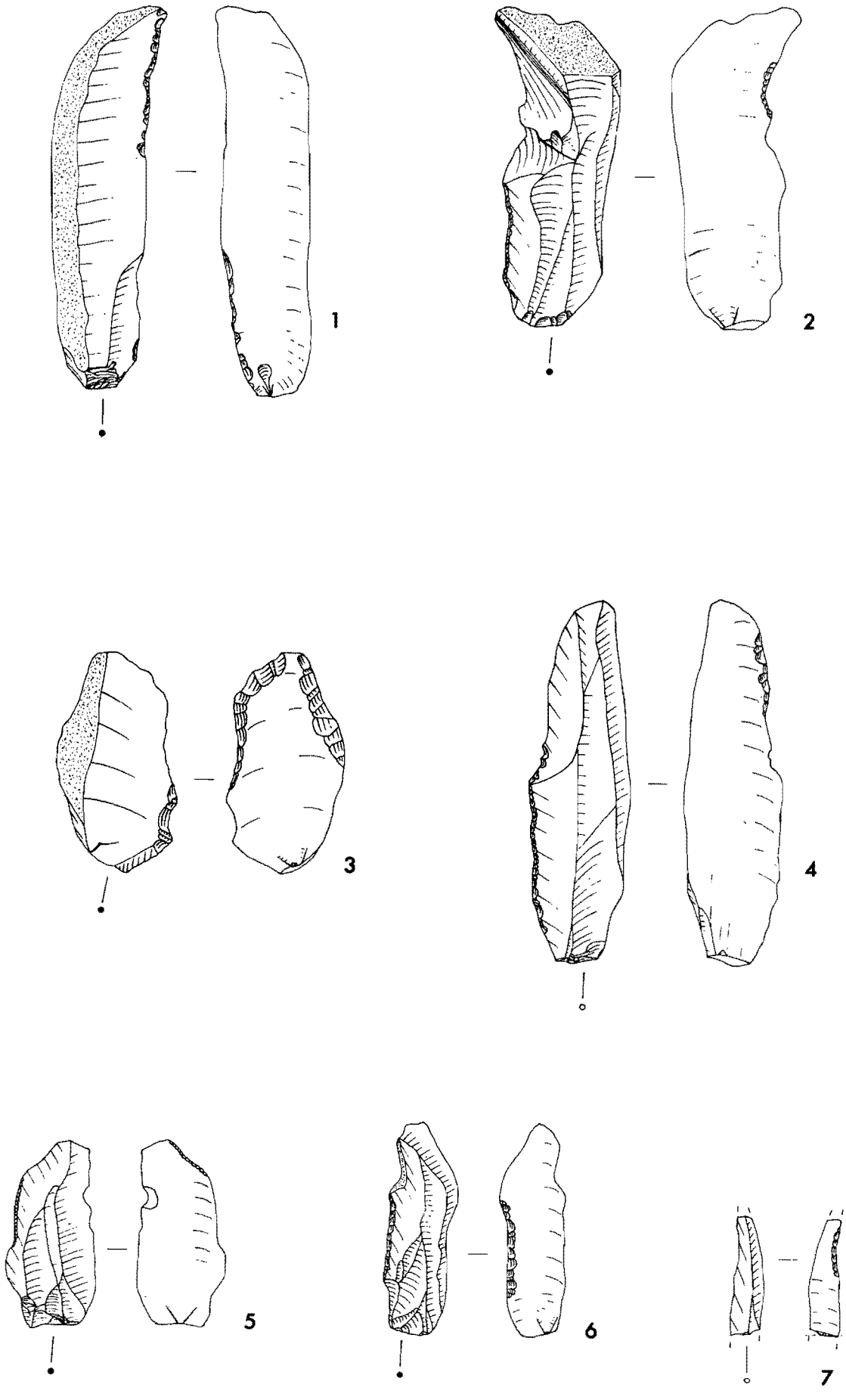

Fig. 9. St. Catherine's Hill. Blades and flakes. Nos. 1-6 alternating retouch. No. 7 inverse retouch. Scale 1:1.

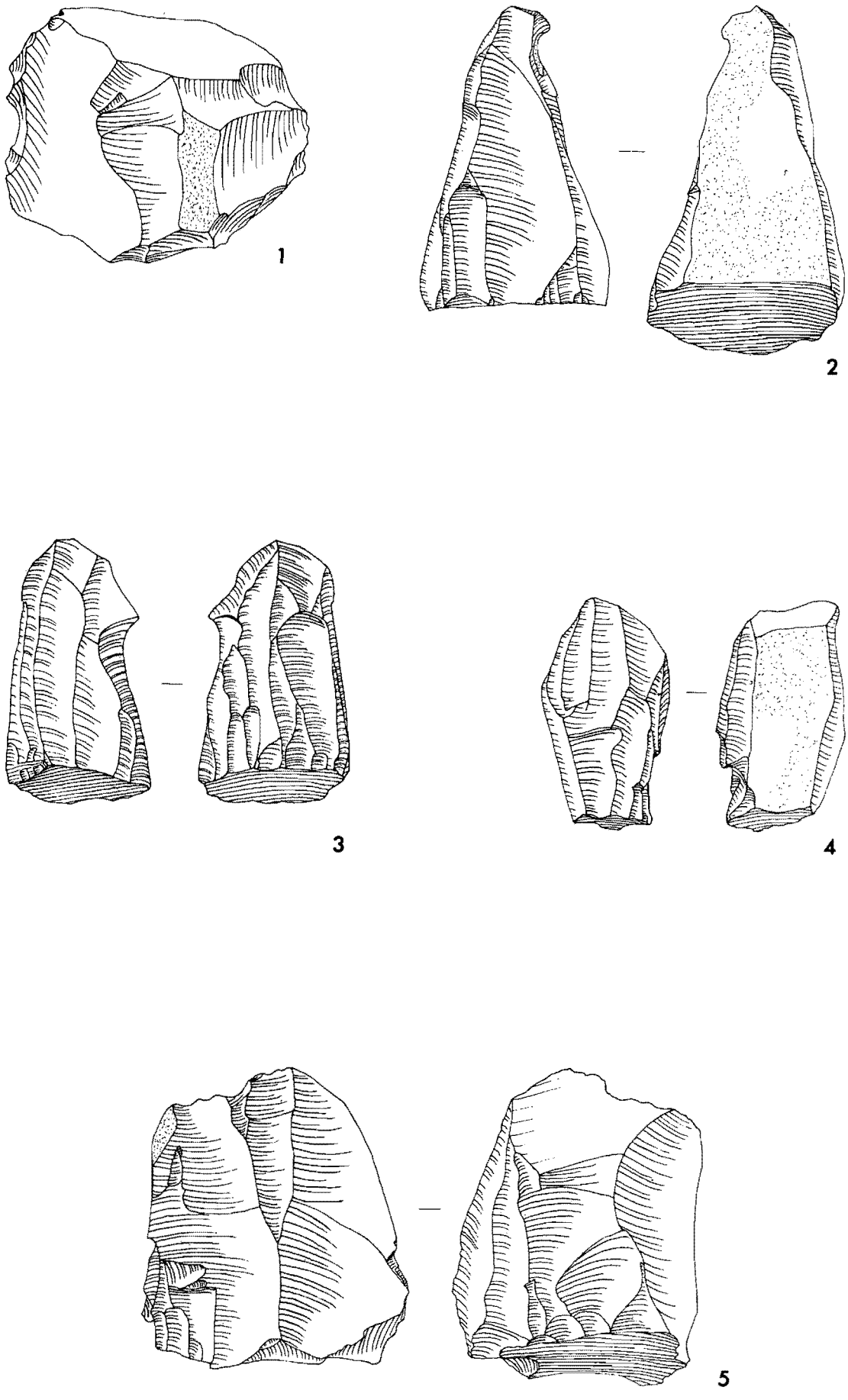

Fig. 10. St. Catherine's Hill. Cores. Scale 1 : 1.

Awls

7 (Fig. 6, nos. 3-9). Clark states that at Farnham awls were very rare, and were only possibly awls, being 'obviously incapable of standing up to hard work' (Clark and Rankine, 1939, 76). The same may be said of the St. Catherine's Hill awls. Two (Fig. 6, nos. 3, 4) have reasonably durable points, but the remainder have been included under this heading because it is customary in British Mesolithic literature to do so. These five are implements which are rare, but a recurrent feature; they are generally broad-based; the retouch is fairly continuous and forms a rough point, or tapering of the flake; they are often thin in section, and it seems doubtful that they could have served as awls.

At Abinger Common they occurred as surface finds, and three illustrated are very similar to some of the St. Catherine's Hill examples (Leakey, 1951, Fig. 11, nos. 10, 16, 17).

In his initial exploration of the Farnham site, Rankine found implements he termed 'dressed flakes . . . thin in section and the flake margins almost entirely retouched' (Rankine, 1939, 70). Some were trimmed to a point (Rankine, 1939, Fig. 27, nos. 3, 5, 8), and show similarities to some of the St. Catherine's Hill examples. In the same publication 'borers' from Farnham are illustrated. While some of these have a reasonably strong, triangular section, several are thinner and similar to the St. Catherine's Hill awls (Rankine, 1939, Fig. 28, nos. 6-8).

An unpublished surface find from Buxted, Sussex, in the possession of Mr. E. Holden, has a roughly-formed, proximal point, bulb intact, and is extremely close in form to Fig. 5, no. 6.

The implement also occurs at Star Carr, where five illustrated parallel the St. Catherine's Hill implements (Clark, 1954, Fig. 10, nos. 179-183).

Retouched and utilised blades and flakes

There are 36 of these representing 36. 4% of the total implements. 11 are utilised only, with edges scarred by irregular micro-flake removals. 25 show definite, regular retouch. 17 have direct retouch only (Fig. 7, Fig. 8, nos. 1-6), 7 have alternating retouch (Fig. 8, no. 7, Fig. 9, nos. 1-6), and 1 has inverse retouch (Fig. 9, no. 7). The definitive feature of this tool is that very light retouch has not modified the original shape of the piece. The amount of retouch is generally short, and never extends along the entire length of an edge. Utilised pieces are generally large, but smaller waste flakes were occasionally used.

It is sometimes stated that it is difficult and frequently impossible to distinguish utilised only from lightly retouched pieces. In the case of the St. Catherine's Hill material, with the aid of excellent lighting and a large magnifying lens (kindly loaned by the British Museum) the distinction was found to be definite. The flake-removal scars on the retouched pieces are frequently not as regular as on, for example, scrapers or microliths; however, the flake-scars are in regular relationship with each other, with none of the marked overlap of utilised only edges; minute negative bulbs of percussion may be observed. It is interesting to note the position of the retouch on particular pieces. It may begin at a natural angle in the flake edge, as if to complete what was in part an already good working edge (Fig. 7, no. 6; Fig. 9, nos. 1, 6). Occasionally one edge of a piece is retouched, while the opposite edge is utilised only (Fig. 7, no. 3; Fig. 8, nos. 3, 6).

SUMMARY OF MACROLITHIC IMPLEMENTS.

Implement	*Number*	*% of total tools*
Scrapers	7	7. 1
Notched blades	5	5
Truncated blades	2	2
Awls	7	7. 1
Retouched blades/flakes	25	25. 3
Utilised only blades/flakes	11	11. 1

Cores

There are 66 cores. Analysis of their forms gives the following results:—

Core	*Number*	*%*
Single platform	40	60. 6
Two platforms	15	22. 7
Globular	11	16. 7

In only a few instances have blades been removed from all round a single platform core. More usual is the presence of cortex on one side of an otherwise typical, conical Mesolithic core.

Five examples of cores from St. Catherine's Hill are illustrated in Fig. 10 (Single platform: Nos. 2, 3; two platforms: nos. 4, 5; globular: no. 1).

COMPARISONS AND CONTEXT OF ST. CATHERINE'S HILL INDUSTRY

An initial comparison of the St. Catherine's Hill and Farnham assemblages reveals fewer parallels than dissimilarities. In both assemblages microliths form the highest proportion of implements, and of the microliths, the obliquely blunted point is the leading form. There the similarities would seem to end. St. Catherine's Hill lacks a whole range of microliths, such as good triangles, other geometrics, backed blades and rod forms which are present at Farnham. It also lacks burins, has fewer scrapers, and no axes, nor evidence for them in even a single axe-sharpening flake.

The differences between the two industries are best illustrated in table form. For Farnham the average for all five locations is used, data for absolute numbers being taken from the excavation report (Clark and Rankine, 1939, 72), and percentages calculated for A: total tools and B: tools excluding utilised waste flakes and blades. As these implements constitute a far higher percentage at St. Catherine's Hill than at Farnham it is necessary to tabulate the data in both forms to avoid accentuating or masking possible differences. For example, the microlith percentages correspond more closely in the two assemblages when the utilised waste-flakes are excluded from the tool count.

Implement	*Number*		*% A*		*% B*	
	St. C.H.	F.	St. C.H.	F.	St. C.H.	F.
Microliths	38	690	38. 4	49. 7	60. 3	66. 1
Scrapers	7	216	7. 1	15. 5	11. 1	20. 7
Notched blades	5	32	5	2. 3	7. 9	3. 1
Truncated blades	2	51	2	3. 7	3. 2	4. 9

Implement	*Number*		*%A*		*%B*	
Awls	7	8	7.1	0.6	11.1	0.8
Burins	0	26	0	1.9	0	2.5
Axes	0	15	0	1.1	0	1.4
Utilised blades and flakes	36	345	36.4	24.8		

Thus at Farnham there are proportionately twice as many scrapers as at St. Catherine's Hill, substantially fewer utilised waste flakes and blades, fewer awls, while core tools, absent at St. Catherine's Hill are a feature.

It will be noticed that in referring to the Farnham material, core-scrapers have been omitted from the tool count and included with the by-products. Core-scrapers cannot survive the work of F. Bordes and D. Crabtree (Bordes and Crabtree, 1969, 5; Bordes, 1969, 11), which has shown conclusively that removal of small flakes from around a platform is designed to remove slight overhangs from previous blade-removals, and is essential if further blades are to be struck successfully. As additional evidence, such small flake-removal scars are found on all blades retaining the proximal end intact; for example Fig. 5, nos. 2, 9, 10, Fig. 7, nos. 3-5, Fig. 9, no. 5, show the feature particularly clearly.

The microlith indices for the two assemblages also indicate clear dissimilarities. The Farnham data for absolute numbers and percentages are taken from the excavation report (Clark and Rankine, 1939, 73).

Microlith	*Number*		*%*	
	St. C.H.	F.	St. C.H.	F.
Obliquely blunted points	25	208	65.8	41
Backed blades	1	48	2.6	9.6
Points with additional distal blunting	0	45	0	8.8
Triangles and sub-triangles	3	144	7.9	28.1
Other geometrics	0	21	0	3.9
Hollow-based points	2	29	5.3	5.9
Tanged points	3	5	7.9	1.1

Here the immediately apparent differences are in the higher proportion of obliquely blunted points at St. Catherine's Hill, and the resultant low numbers or absence of other microliths.

It was decided to compare the two assemblages more closely and to examine the Farnham material at first-hand. That from Pit II, alone of all the Farnham material, is in the possession of the British Museum, and available for study. Clark emphasized the homogeneity of the Farnham industry within the five excavated locations (Clark and Rankine, 1939, 72). His tables of general composition and microlith forms bear this out (Clark and Rankine, 1939, 72-3). Absolute numbers only are given, but calculations prove that percentages of various implements are very close for each location. Therefore, it was decided that it would be valid to use the material from Pit II for purposes of comparison with the St. Catherine's Hill assemblages. Pit II material comprises 9, 176 pieces of struck flint, roughly two and a half times the amount from St. Catherine's Hill, and there are no anomalies in the numbers of any of the various implements as compared with the other Farnham locations, or with the average for all locations.

Comparisons between the two assemblages are again best expressed in table form. Absolute numbers are taken from the Farnham report, and percentages calculated.

GENERAL COMPOSITION

Implement	*Number*		*% A*		*% B*	
	St. C.H.	F II	St. C.H.	F II	St. C.H.	F II
Microliths	38	164	38.4	51.1	60.3	61.9
Scrapers	7	61	7.1	19	11.1	26.8
Notched blades	5	4	5	1.2	7.9	1.4
Truncated blades	2	22	2	6.8	3.2	8.3
Awls	7	2	7.1	0.6	11.1	0.7
Burins	0	11	0	3.4	0	4.2
Axes	0	1	0	0.3	0	0.4
Utilised blades and flakes	36	56	36.4	17.4		

MICROLITHS

Implement	*Number*		*%*	
	St. C.H.	F II	St. C.H.	F II
Obliquely blunted points	25	37	65.8	34.6
Backed blades	1	13	2.6	12.2
Points with additional distal blunting	0	13	0	12.2
Triangles and sub-triangles	3	35	7.9	32.7
Other geometrics	0	4	0	3.7
Hollow-based points	2	4	5.3	3.7
Tanged points	3	1	7.9	0.9

Whilst one is aware of the inherent dangers in comparing assemblages within which certain implements are present in very low numbers, especially when presenting the data in terms of percentages, it is of value to note that St. Catherine's Hill, which is a complete assemblage, does lack the geometrics so plentiful at Farnham (apart from one poor triangle and two sub-triangles), and has proportionately more hollow-based and tanged points.

Where one may be on safer ground is in comparing the obliquely blunted points within the two assemblages. There are reasonably large numbers of them: 25 from St. Catherine's Hill, 37 from Farnham Pit II. Clark originally recognised eight variants of the obliquely blunted point (Clark, 1934b, 56), which gives scope for the possibility of diversity within each group.

However, on examination of the two groups of obliquely blunted points (which form the largest proportion of the microliths in each case), it is immediately apparent, without measurements being taken or typological studies made, how similar they are. Farnham Pit II microliths are illustrated in the excavation report (Clark and Rankine, 1939, Fig. 7). The type-tool in both assemblages seems to be that as illustrated in Fig. 3, nos. 1-6. It is undoubtedly made by microburin technique, which has removed the bulb of

percussion. The retouch is always on the right edge of the bladelet, forming a durable, proximal point, and grading smoothly into the unretouched part of the edge. The distal end is unretouched and naturally pointed; it is extremely well-made and the overall proportions vary hardly at all in each of the examples.

10 of the 25 obliquely blunted points from St. Catherine's Hill belong to this first group, including pieces broken but definitely assignable here (Fig. 3, nos. 1-10). 15 of the 37 obliquely blunted points from Farnham Pit II show the same features. As regards shape, size-range and retouch type the two groups of points are identical, and could not be separated if mixed.

A second distinctive variant of the obliquely blunted point is that made on a less regularly shaped bladelet. The proportions vary extensively in different examples (Fig. 3, nos. 11-15), and the distal end is rounded not pointed. The retouch is as on the first group of points, described above. There are 5 of these from St. Catherine's Hill, including a broken piece. There are 9 from Farnham Pit II.

A third, distinctive variant of obliquely blunted point occurring in fewer numbers in both assemblages, is that formed by a truncated bladelet, i.e. abrupt retouch forms a definite angle not only with the left edge of the bladelet, but with the unretouched part of the right edge. In both assemblages the distal end of this point is unretouched and pointed, never rounded There are 3 of them from St. Catherine's Hill (Fig. 3, nos. 16-18), and 5 from Farnham Pit II.

A fourth variant, again of which there are relatively few in each assemblage, is an obliquely blunted point with retouch as the first group and with additional, extremely light retouch on the left edge beginning at the distal tip. There are 3 examples from St. Catherine's Hill (Fig. 3, nos. 19-21) and 4 from Farnham Pit II, including fragments.

The remainder of the obliquely blunted points in each assemblage are proximal fragments which are not truncations, but where the distal shape and possible presence of further light retouch cannot be ascertained.

Presented in table form the analysis of the obliquely blunted points in both assemblages is as follows:—

Obliquely blunted point variant	*Number*		*%*	
	St. C.H.	F II	St. C.H.	F II
1	10	15	40	40.5
2	5	7	20	18.9
3	3	5	12	13.5
4	3	4	12	10.8

That these variants are undoubtedly closely related in form and perhaps in function also is undeniable. But in the context of the great dissimilarity between the two assemblages, in general implement and in microlith types, it seems of significance that the major microlithic implement in each assemblage, i.e. the obliquely blunted point, should show such consistency in the relative proportions of its distinct variants. Comparisons of the implement indices of the two assemblages as a whole could reasonably lead to the conclusion that totally different cultural groups are represented. But analysis of the major microlith implement implies that the cultural affinity between the Farnham and St. Catherine's Hill groups is very close indeed. There would seem to be reasonable grounds for supposing that, even if the 'hunting party' theory cannot be proposed irrefutably, then some kind of specialized activity within the cultural group, as represented at Farnham, may be offered as an explanation for the content of the St. Catherine's Hill assemblage. Amongst the choices of specialized activities, one would of necessity, given the basis of Mesolithic economy as at present understood, have to include a hunting group.

But whatever the activity was, it did not apparently require axes or burins, large numbers of small geometric microliths, nor as many scrapers, as did the large, permanent Farnham site. It required a limited range of microliths and involved the use of far more large waste flakes and blades, whose edges were not too carefully retouched or were used as they were. In reality, this accords well with the idea of a hunting party; but it must be emphasized that this can only remain an hypothesis.

To attempt to discover if further evidence of affinity exists between the two assemblages, the material was examined for certain technological features. The incidence of retouch other than direct (which results in the appearance on the dorsal surface only of flake-removal scars) was looked for. In neither assemblage did the macrolithic implements show any evidence of retouch other than direct. With regard to the microliths, 7 from Farnham Pit II (4.3%) have inverse retouch, as do 2 from St. Catherine's Hill (5.3%). Little significance can be attached to this however, as the incidence of inverse retouch is not related to the same microlithic implements within each assemblage.

25 of the St. Catherine's Hill utilised blades and flakes have definite retouch. In the Farnham report, figures for retouched utilised pieces are not given, but the 56 utilised flakes recorded (Clark and Rankine, 1939, 72) were examined and all seemed to show definite retouch. The two groups were examined for retouch-type, and the results are best expressed in table form:

Retouch-type	*Numbers*		*%*	
	St. C.H.	F II	St. C.H.	F II
Direct only	17	36	68	64.3
Alternating	7	17	28	30.3
Inverse only	1	2	4	3.6
Alternate	0	1	0	1.8

Obviously the counts of pieces with inverse or alternate retouch cannot be given any weight, because of the low numbers involved. However, the fact that the incidence of direct retouch only, and of alternating retouch, corresponds so closely in the two assemblages, constitutes additional reasonable evidence of their affinity.

The cores were then examined and classified giving the following comparative results:—

Core	*Number*		*%*	
	St. C.H.	F II	St. C.H.	F II
Single platform	40	137	60.6	46.5
Two platforms	15	101	22.7	32.8
Globular	11	70	16.7	20.7

The percentages in each assemblage do not correspond as closely as do those for the obliquely blunted

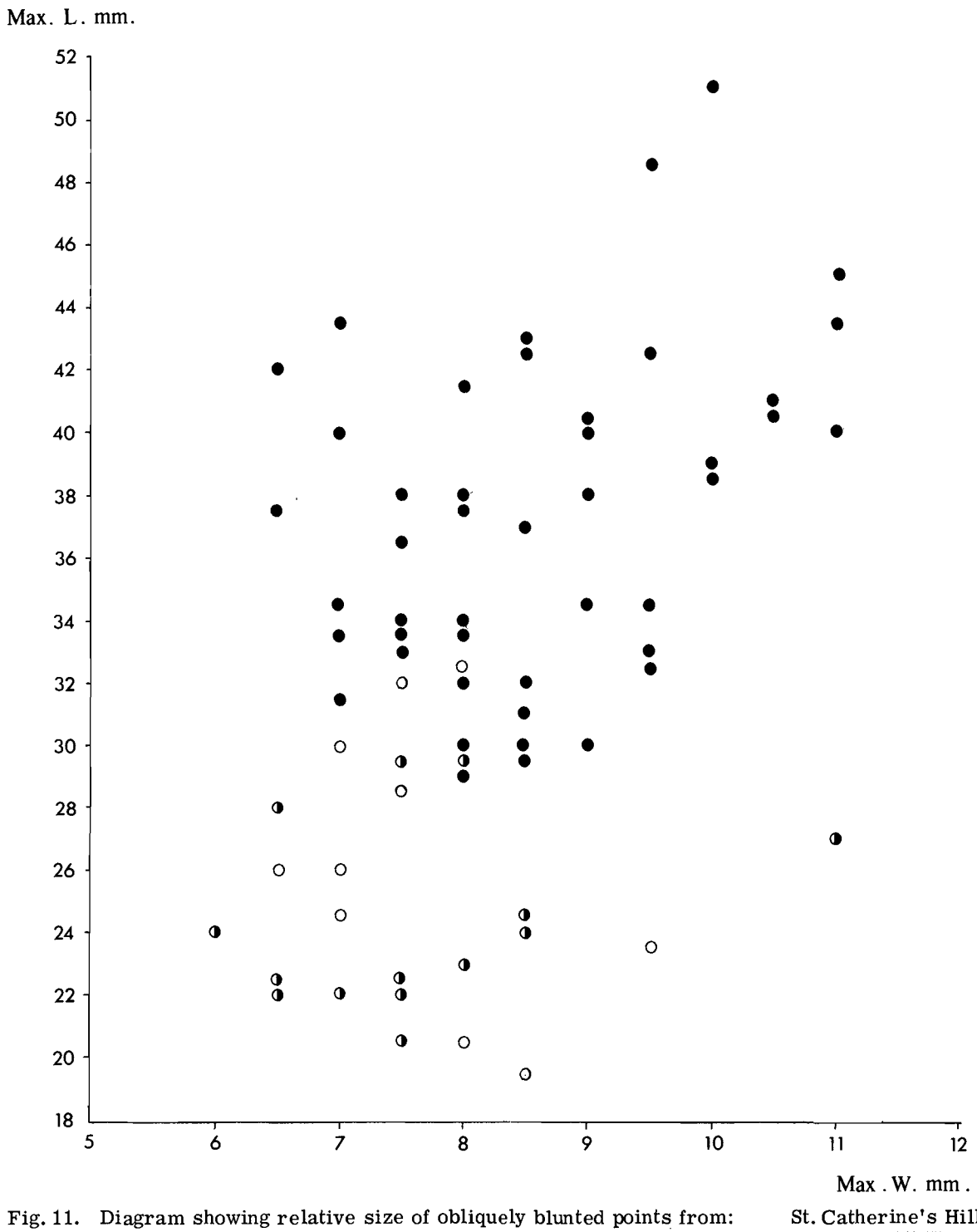

Fig. 11. Diagram showing relative size of obliquely blunted points from: St. Catherine's Hill ○ Farnham Pit II ◑ Oakhanger V & VII ●

microlith forms, or for the retouch-type of the utilised blades and flakes. The three core forms are present however, in the same order of frequency. The different percentages might be in part a reflection of the noted differences in microliths between the two assemblages.

Finally, Farnham Pit II is rich in geometrics (36.4% of the microliths), while St. Catherine's Hill has one poor triangle and two sub-triangles. 35 of the 39 geometrics from Farnham Pit II are triangles or sub-triangles (27 and 8 respectively). Whatever activity was pursued at St. Catherine's Hill, it did not require large numbers of geometrics, but it seems worth noting that the only geometrics found there are of the form dominant at Farnham.

It is beyond the scope of the present paper to compare in any detail the St. Catherine's Hill material with that of Oakhanger. Comparison of the general composition however of Farnham and Oakhanger V & VII (the most prolific of the Oakhanger sites), shows significant differences. There are proportionately twice the number of scrapers at Oakhanger V & VII

than at Farnham (42% of the total tools as against 20.7%); there are proportionately half as many microliths (36.7% against 66.1%); there are 1,045 finely serrated 'saws' (13.4%), an implement totally absent at Farnham. These two sites do not seem to have close cultural affinities. The difference might be temporal. Professor G. Dimbleby assigned Oakhanger VII to an early Atlantic phase (Dimbleby, 1960, 259), and a C14 date of 6,300 ± 200 BP was obtained. In this context the presence of 'saws' at Maglemosian sites such as Star Carr and Thatcham might be significant.

Comparison of the microlithic obliquely blunted points from all three assemblages gives confirmatory results. Fig. 11 shows the relative size of all the unbroken points (or those which were estimated to have lost not more than 1 mm) from St. Catherine's Hill and Farnham Pit II, and of fifty points from Oakhanger V & VII, picked by a method which ensured that the sample was random. The closeness of the Farnham Pit II and St. Catherine's Hill size ranges, and the difference between these, and that of Oakhanger V & VII is marked. There is indeed, little overlap.

Having drawn the conclusion that the St. Catherine's Hill material suggests a group belonging to a southern British Mesolithic culture as represented at Farnham, one naturally looks for evidence of other such groups, represented by a similarly limited range of implements.

The chief problem in considering other Mesolithic material from the Lower Greensand area, is its incompleteness and frequent dubious provenance. Some collections contain reasonable amounts of implements, but these have been gathered from too wide an area for comparative studies to be valid. Material from Trunley Heath, Shalford Common, Seale District, Thursley Common, Munstead Heath, Farley Heath and Rodsall has this disadvantage (see Fig. 14).

Essentially St. Catherine's Hill material in its microlithic facies, consists of obliquely blunted points with a few hollow-based, and tanged points, all very well made. The presence of hollow-based, and tanged points at St. Catherine's Hill in higher proportions than at Farnham may be explained perhaps by the former site being closer to the Horsham centre. The group of sites there whose material was the basis for the definition of the Horsham culture (Clark, 1934b, 52) produced an average of 26.5% hollow-based and tanged points. Whatever the wider affinities of the Horsham culture may be, the distribution of the hollow-based and tanged points with its focus on the Beeding Wood, Faygate, etc. group is a reality. (The tool may indicate an environmental, as much as a cultural response). Selmeston, for instance, attributed by Clark to the Horsham culture, gave only 7.5% hollow-based and tanged points (Clarke 1934a, 143). Their presence in greater proportions at St. Catherine's Hill than at Farnham is consistent with the distribution pattern.

Both Clark (Clark and Rankine, 1939, 96) and Wainwright (Wainwright, 1961, 216) state that the Farnham affinities are with the Horsham culture. Therefore according to their definition of that culture, St. Catherine's Hill must also belong here. The classic Horsham assemblage contains a high proportion of geometric microliths, but this need not contradict St. Catherine's Hill's apparent Horsham affinities.

Not only are many sites attributed by Wainwright to the Horsham culture, without geometric microliths, but even of the sites from the focal group analysed by Clark in 1934, three are almost, or entirely without geometrics (Newstead: none; New Faygate: 1 triangle; Roffey Small: 2 triangles) (Clarke, 1934b, 61).

When looking for precise parallels to the St. Catherine's Hill material, one is looking for an obliquely blunted point/hollow-based and tanged point association in the microlith facies; also perhaps for small numbers of scrapers, truncated blades, awls or notched blades.

The following sites provide evidence, of varying quality, for parallels to the St. Catherine's Hill situation:

Caesar's Camp (Fig. 14, no. 11) is comparable in siting; it lies on the end of a bluff promontory, close to water. The surface-collected material comprises 12 obliquely blunted points, 1 triangle, 1 sub-triangle, 1 tanged point, 'a few scrapers', and 1 tranchet axe (Rankine; 1939, 119). Apart from the axe, the parallels with St. Catherine's Hill are very good, in siting and in the obliquely blunted points/triangle/tanged point association and proportions.

Chapel Field, Tilford (Fig. 14, no. 13) is a river bluff site, forty feet above the river at 200 feet O D Rankine reported 67 surface-collected microliths, mostly obliquely blunted points, and including 6 triangles, and 1 hollow-based point (Rankine, 1939, 107). The microliths in association, and setting, are as at St. Catherine's Hill.

Tilford District (The Edge Collection) (Fig. 14, no. 60) is reasonably provenanced to an area above the river near the church. The limited range of implements collected includes 8 obliquely blunted points, 4 notched blades, truncated bladelets, and no geometric forms (Rankine, 1939, 110). The comparisons with St. Catherine's Hill seem good. The collection also included axes, but these alone of the flints were patinated, and must have been acquired elsewhere.

Kettlebury II (Fig. 14, no. 33) is on a steep hillside, close to a stream. 41 microliths were recovered by excavation in 1936, mostly obliquely blunted points, with some triangles, 4 hollow-based points of a localized type (Frensham points); also 3 scrapers and 3 truncated blades (Rankine, 1951, 33). The site provides a reasonable parallel to St. Catherine's Hill, and is made interesting by finds from Kettlebury I 200 yards away (Fig. 14, no. 32), which on excavation produced a mere 381 flints. The only implements were 18 scrapers, 30 large utilised flakes and 4 microlith points (Rankine, 1951, 33). Could this have been an area where skinning and cutting up of carcasses took place? And if so, was it connected with a hunters' camp at Kettlebury II?

Lion's Mouth I (Fig. 14, no. 36) lies in a small depression just above the 200 foot contour. 12 microliths were excavated: obliquely blunted points, triangles and 1 hollow-based point. There were also 6 utilised blades and 1 notched blade (Rankine, 1951, 33).

Lion's Mouth II (Fig. 14, no. 37) lies 200 yards north of the previous site; excavation produced 8 microliths, again obliquely blunted points, triangles and 2 hollow-based points (Rankine, 1951, 34).

The comparison with St. Catherine's Hill for both Lion's Mouth sites is reasonable (as far as the small

amount of material permits comparison) in the association of microliths, presence of utilised blades and absence of core tools.

Frensham Great Pond North (Fig. 14, no. 24) was excavated in 1937 and produced 16 obliquely blunted points, 7 'knife-flakes' (utilised flakes?), 1 serrated flake and 7 scrapers (Rankine, 1951, 7). Interestingly, Rankine interpreted the site as suggesting 'a brief occupation... by a limited group of persons' and concluded that this was a 'hunters' bivouac.'

Abinger Hammer (Fig. 14, no. 1) is sited just south of a small wood capping a hill, at 475 feet O D. Its surface collected material comprises notched blades, 1 obliquely blunted point, 2 triangles and 2 hollow-based points (Wood, 1952, 23). There is Neolithic admixture, but Wainwright considers 1 scraper (of the 9 found) to be Mesolithic (Wainwright, 1961, 163).

Some of the sites which Hooper recorded in 1933 seem to indicate reasonable parallels to St. Catherine's Hill, although the evidence is fragmentary. These sites lie to the east of St. Catherine's Hill, and geographically their affinity presents no problem.

Leith Hill (Fig. 14, no. 34) Hooper reports obliquely blunted points, cores and end-scrapers as surface finds, and states that 'several of the flakes show signs of use or secondary work.' (Hooper 1933, 71). Thus here there is an association of obliquely blunted points, utilised flakes and scrapers.

Leith Hill South (Fig. 14, no. 35). Here microliths consisted only of obliquely blunted and hollow-based points. Macrolithic material included 'not very numerous' scrapers, 'fairly common' notched flakes, and 'a few rather unconvincing awls' (Hooper, 1933, 72). All are surface finds. The range of implements seems exactly as that from St. Catherine's Hill.

Reigate Heath (Fig. 14, no. 49). Here the only microliths found, in concentrations on the north and south edge of the heath, were obliquely blunted and hollow-based points (Hooper, 1933, 69).

Wotton Common (Fig. 14, no. 68) is sited on a flat, high area between two valleys. Again the microliths reported are only the obliquely blunted and hollow-based points (Hooper, 1933, 70).

Goldhorde Field (Fig. 14, no. 14), one of the Wealden sites at Chiddingfold, produced many non-defined microlithic points, hollow-based and tanged points, as surface finds (Hooper, 1933, 67).

Material from other Mesolithic find-sites is frustrating in its even greater paucity than any from the above-mentioned sites. For example, both Moor Park sites and Snailslynch (Fig. 14, nos. 39, 40, 57) are river bluff sites, but little more than cores and scrapers are recorded (Rankine, 1939, 98, 102), and material from Snailslynch is dispersed in private collections. Crooksbury Hill (Fig. 14, no. 19), a hill-top site, produced 'microliths' (no details given) as surface finds (Rankine, 1939, 104).

Whilst many Lower Greensand Mesolithic sites have been subject to erosion, several have been found sealed at a depth of 6-18 inches. Limited excavations of even a few such sites would yield, through study of associated implements, economic and social information. More extensive excavation might give information concerning the vexed question of the temporal relationships of these groups.

THE PATINATION

Nearly all of the material from St. Catherine's Hill is patinated to some degree. Approximately 60% of the implements and by-products, excluding non-utilised waste flakes, are patinated to an opaque white. The thickness of this patination measured on two broken pieces is 0. 5 mm. Proportionately more of the smaller pieces are completely patinated, the larger pieces tending to show more frequently the bluish or greyish-white colouring.

Patination of flint cannot occur simply from exposure; calcareous conditions are essential.

Dr. I. Cornwall was kind enough to examine some pieces of patinated waste material. He gave it as his opinion that the flint had lain in a calcareous soil for 'several hundred years', and that such a soil must have contained a great deal of free calcareous matter, such as one would expect in a chalk soil. Many of the white pieces showed iron-staining: dark grey mottling, varying in extent from a line along an edge or ridge, to overall mottling. Dr. Cornwall stated that this deposition could have taken place only whilst the flints were lying in an acidic soil.

Thus the St. Catherine's Hill material presented two problems. Firstly, how could it have been contained within a calcareous soil for several hundred years, while the site is definitely on the Lower Greensand? Secondly, how did it later come to be contained within a soil sufficiently acidic for iron-deposition to have taken place? Four possibilities were examined, and dismissed:—

1. There is no question of the flints having moved over any distance, as their condition and the completeness of the assemblage shows.

2. Mr. E Wood, who has intimate knowledge of the geology and topography of Surrey, and who has made several references in print to the problem of Mesolithic flint patination, was kind enough to comment on the St. Catherine's Hill question. Although the site is close to the chalk he states: 'I see no possibility of transfer of flints from the chalk to the sand by down wash or any natural process. There is a deep valley between them'. i.e. the chalk ridge and St. Catherine's Hill (Wood, 1973, pers. comm.). Therefore downwash could not have operated to affect the site in any way; for example, calcareous material from the chalk could not have reached the site to alter its soil type.

3. It is generally acknowledged that the Lower Greensand would always have given an acidic soil because of its constituents: mainly quartz with some limonite and glauconite, and local, thin veins of ironstone or carstone. Therefore, post-Mesolithic events giving a change from a basic to acidic soil on the Lower Greensand, can be discounted.

4. Occasionally in areas of acidic soil conditions localized base-rich areas can be found in conjunction with rivers. This occurs if the rivers issue from, or flow through, base-rich areas prior to reaching the acidic soils. St. Catherine's Hill overlooks the river Wey; this however has passed through more than twenty-four miles of Lower Greensand country before reaching the site. It cannot possibly have contributed calcareous material.

The Lower Greensand consists of (in geological sequence) the Hythe Beds, Bargate Beds, Loamy and

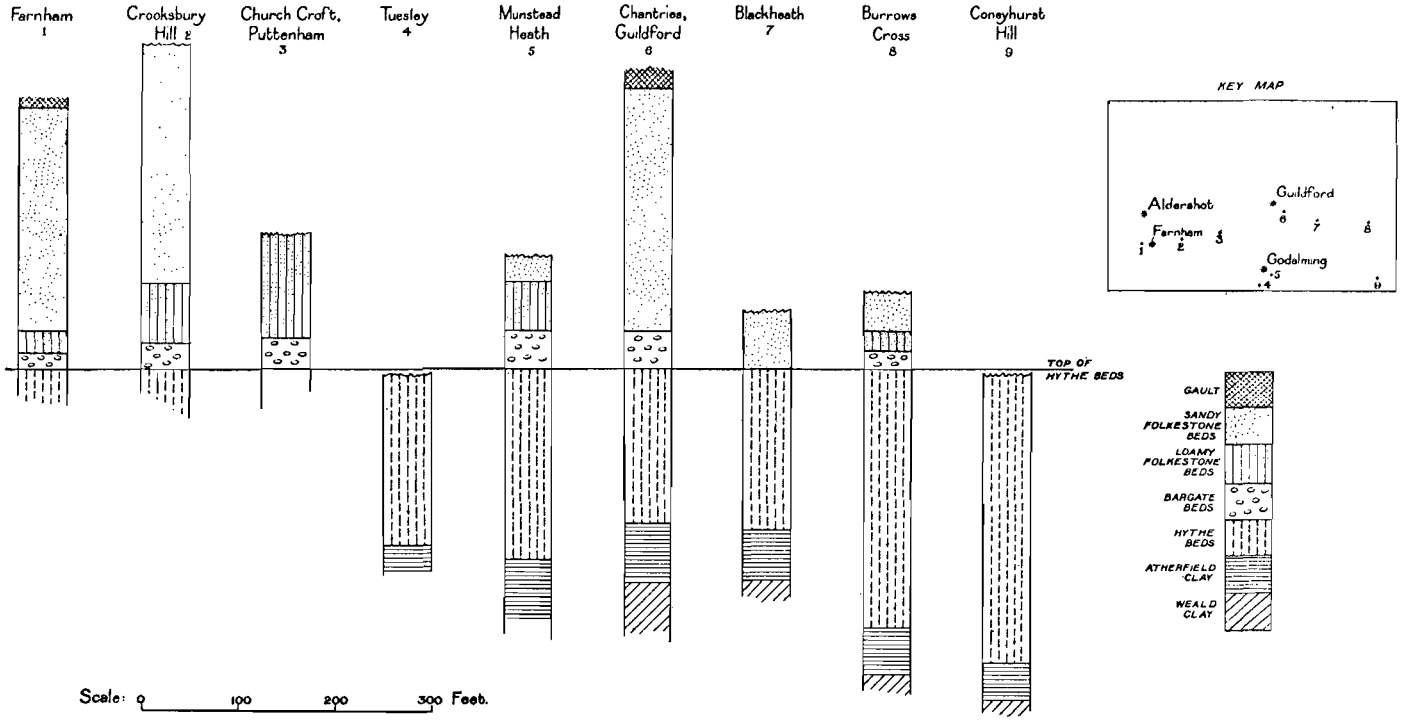

Fig. 12. Variations in thickness of the divisions of The Lower Greensand. From the Geological Survey Memoir No. 285 (1929).

Sandy Folkestone Beds. Fig. 12 shows that not only have there been differential rates of erosion within a comparatively small area, but that either due to differential erosion rates in earlier geological periods, or to factors affecting rates of deposition, the depth of these deposits and even their presence, is variable.

One consistent factor is the shallow nature of the Bargate Beds deposit, wherever this exists. It has a limited distribution, has been eroded completely in some areas because of faulting, such as Down Farm (Fig. 13, map 2) and was not deposited in others, the Blackheath area for example. The outcrop represents the top of a dissected plateau, roughly centred on Godalming. Its northern outcrops are mainly narrow. The beds present a geological problem in their unconformity on the Hythe Beds. The deposits seem to have been formed in a clear, shallow sea with land in the vicinity. Pebble beds are an identifying feature, as is the interesting fossil content: brachiopods and amonites, which would have been indigenous, but also many derived, chiefly Jurassic fossils (Dines and Edmunds, 1929, 22).

Clearly the Bargate Beds represent something different from the rest of the Lower Greensand. In the mid-nineteenth century, C.J.A. Meyer became interested in the deposit, and in 1868 wrote that his experiments had shown the Bargate Beds to be extremely calcareous, some specimens containing up to 70% calcareous matter (Dines and Edmunds, 1929, 23). The fossil content would be consistent with his findings.

Work by F. Chapman and J. W. Gregory in the late nineteenth century showed that Bargate Beds frequently lie very close to the ground surface beyond their main distribution, and because of the undulating terrain, can occur as very localized outcrops (Dines and Edmunds, 1929, 29).

An outcrop of Bargate Beds lies just to the south of St. Catherine's Hill and peters out across the river bed (Fig. 13, map 2; Fig. 14). Dines and Edmunds record several of the localized outcrops traced by Gregory and published by him in 1895. They report: 'In the railway cutting a quarter of a mile east of Braboeuf House, Guildford, pebbly sand and some pebbly sandstone is found... the river cliff of St. Catherine's Hill... the beds at the top of the river cliff show a honey-combed mass of carstone.' That is, Folkestone Beds at the top only of the hill(Dines and Edmunds, 1929, pp. 29, 37). Figs. 2 and 13 prove beyond doubt that the St. Catherine's Hill railway cutting, close to which the assemblage was recovered, is that referred to.

The Mesolithic site at St. Catherine's Hill, whilst on the Lower Greensand, is actually on calcareous Bargate Beds. The flint patination would seem to be explained. Meyer's finding of up to 70% calcareous matter would concur with Dr. Cornwall's statement that a great deal of free calcareous matter must have been present.

As for the subsequent acidification of the flint-containing deposit, giving the iron-deposition, the probable answer is that down-wash of Folkstone Beds material eventually gave acidic conditions. The extent of the flint patination proves that the soil on the lower slope was completely free of acidic down-wash for several hundred years, therefore one must infer the presence of vegetation for a period of such duration, following the Mesolithic activities, preventing soil movement. Subsequent removal of this vegetation must have allowed down-wash of acidic, ferruginous material onto the lower slope.

With regard to the general problem of patinated Mesolithic flint-work, Fig. 14 shows which sites lie on or near Bargate Beds outcrops. The possibility

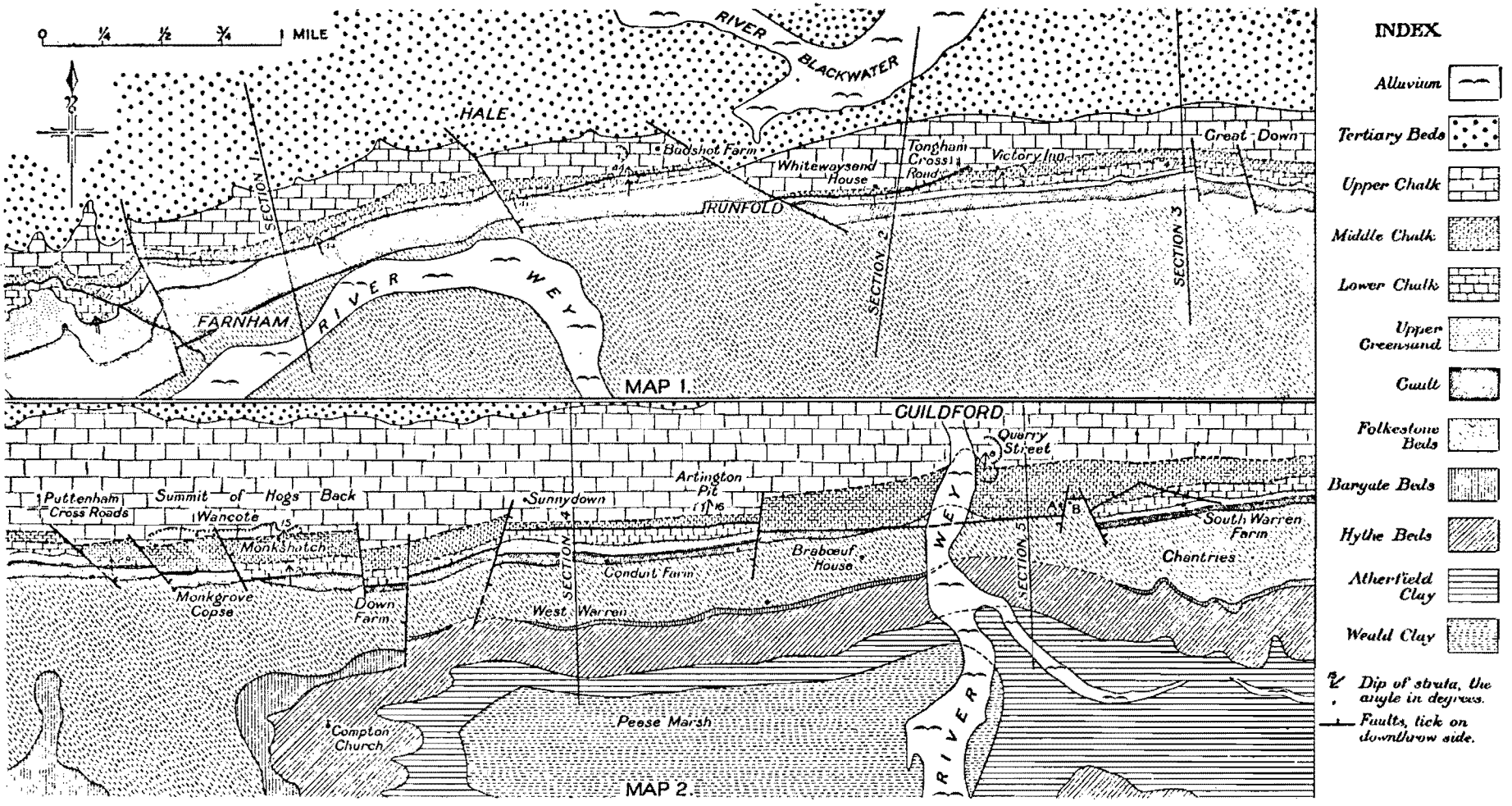

Fig. 13. Faulted areas of The Hog's Back. From the Geological Survey Memoir No. 285 (1929).

of localized exposure beyond the shown extent must always be considered.

Gregory reported traces of Bargate Beds just west of Farley Heath (Dines and Edmunds, 1929, 29). Material from the site (Fig. 14, no. 21) is unpublished, but the British Museum possesses 2 waste blades, almost certainly Mesolithic, marked 'Farley Heath', and these are patinated opaque white.

Between Chantries (Fig. 2), Weston Wood and Albury there are several exposures of Bargate Beds. Some of the material from Weston Wood (Fig. 14, no. 66) is patinated from bluish-white to white (E. Machin, pers. comm. see p. 106). The material from Brook, Albury (Fig. 14, no. 9) is unpublished, but the British Museum has a Mesolithic end-scraper on a blade which is patinated white.

Tyting Farm and St. Martha's Hill (Fig. 1; Fig. 14, nos. 63, 59) both occur close to Bargate Beds outcrops. In fact, not far from St. Martha's Hill church the deposits exist to a depth of fifteen feet. (Dines and Edmunds, 1929, 29). There is nothing published relating to either site, but the Guildford Museum possesses a few Mesolithic pieces from the St. Martha's Hill site; these are well patinated. Mesolithic material, also patinated to a bluish or greyish-white, has been found 'within a comparatively short distance' of Tyting Farm by the Curator of Guildford Museum, who states that Mesolithic flint-work from the Chantries and this local area is generally so patinated (Holling, 1973, pers. comm.).

After vanishing near Tillingbourne, the beds re-appear at Abinger Hammer, where the Mesolithic site (Fig. 14, no. 1) produced well-patinated implements (Wood, 1952, 23; 1955, 136).

Wotton Common (Fig. 14, no. 68) gave microliths with 'bluish patination' or 'lustrous white' (Hooper, 1933, 70). This site occurs in direct line with, and half a mile east of the apparent disappearance of the Bargate Beds. It would seem likely that the beds lie close to the surface in the area of the site, and probably outcrop locally.

A site adjoining the northern edge of Blackheath is quoted by Hooper as giving 'more or less patinated' Mesolithic implements (Hooper, 1933, 76). The site reference is vague but parts of the northern edge of the heath are within 450 yards of Bargate Beds outcrops.

Barford (Fig. 14, no. 4) lies well within the Bargate Beds, but the whereabouts of the material from the site is unknown, and there are no accounts of it. The British Museum has an Acheulian hand-axe marked 'Churt' (a village roughly a quarter of a mile from Barford); this is strongly patinated white.

Thus there is evidence, if occasionally flimsy, for patination of flints from ten sites including St. Catherine's Hill, which lie on Bargate Beds outcrops, or where localized outcrops have been reported. It seems extremely likely that the calcareous nature of the Bargate Beds is responsible for the patination. It would be of great interest to search out unpublished Mesolithic material from such areas, at present in private collections, to see if this is the solution to the problem of patinated Mesolithic material from the Lower Greensand.

SUMMARY

The industry from St. Catherine's Hill, although representing a limited range of known Mesolithic implements, appears to be closely related to the Farnham group (and therefore, ultimately, to the Horsham culture as at present defined). The evidence for this assumption lies chiefly in the varying forms of the main microlithic implement (the obliquely blunted point) and in certain technological features; these occur in closely similar proportions in the two assemblages.

Some specialized activity within the main group might be hypothesized, and similar associations of a limited range of implements are known from other Lower Greensand Mesolithic sites, some of which have a similar topographical setting to St. Catherine's Hill.

The patination of Mesolithic implements to varying degrees, which has been an occasional, somewhat puzzling feature of Lower Greensand sites, on present evidence seems to be due to an apparent coincidence of such sites with Bargate Beds outcrops. These, unlike the rest of the Lower Greensand deposits, according to analysis of the material and observed fossil content, are highly calcareous.

APPENDIX: LIST OF FRENCH TYPOLOGICAL TERMS USED

1. *Backed blade or bladelet:* one edge has been blunted by regular, continuous and abrupt retouch along its entire length (Tixier, 1963, 26; Sonneville-Bordes and Perrot, 1956, 534).
2. *Partially-backed blade or bladelet:* one edge has been blunted by regular, continuous, abrupt retouch which does not continue along its entire length (Tixier, 1963, 124).
3. *Truncated blade or bladelet:* a line of continuous, regular retouch, nearly always abrupt, forms two more or less clear angles with the edge of the implement. The truncation can be normal (perpendicular to the axis of the blade or bladelet) oblique, concave or convex (Tixier, 1963, 127; Sonneville-Bordes and Perrot, 1956, 548).
4. *Retouch*:
   (a) *Direct:* removals begin from the upper surface (Tixier, 1963, 32).
   (b) *Inverse:* removals begin from the lower surface (Tixier, 1963, 34).
   (c) *Alternate:* worked along part or all of both edges of a piece, beginning from the upper surface on one edge, and from the lower surface of the opposite edge (Tixier, 1963, 26).
   (d) *Alternating:* begins alternately from one surface then from the other on the same edge of a flake, blade or bladelet (Tixier, 1963, 26).
   (e) *Abrupt:* removals form a near right-angle with the lower surface, clearly reduce the width of the piece, thus removing the cutting edge it occupies, forming a 'back' (Tixier, 1963, 47).

ACKNOWLEDGEMENTS

I should like to thank Mr. de G. Sieveking of the British Museum's Department of Prehistoric and

Romano-British Antiquities for allowing access to the St. Catherine's Hill and other Mesolithic collections; also his staff for their helpful co-operation. I should especially like to express my thanks to Dr. I. Cornwall and Miss J. Sheldon for much helpful advice concerning conditions necessary for flint patination, and iron-deposition; and again to Miss Sheldon for information concerning a surface find from Buxted, and for acquiring on my behalf unpublished material relating to Weston Wood, Albury; also to Mrs. E. Machin for kindly lending this manuscript. To Mr. E. Wood I am very grateful indeed for information concerning his references to Mesolithic flint patination, and for other information. I should also like to thank Dr. J. d'A. Waechter for his help, and Mr. H. Stewart for advice on certain aspects of flint-drawing procedure. I am indebted to Dr. M. Newcomer who, in the initial stages of my examination of the St. Catherine's Hill material, gave invaluable advice; and who, despite commitments of his own was unfailingly helpful and kind when consulted over specific problems which arose later. Finally I should like to thank Professor Grimes for a grant which enabled the flint illustrations and distribution map to be reproduced.

BIBLIOGRAPHY

Bordes, F., 1951. 'Le complexe Moustérien: Mousteriens, Levalloisien et Tayacien.' *L'Anthropologie* **55**, 1

Bordes, F., 1961. *Typologie du Paléolithique Ancien et Moyen*

Bordes, F., 1969. 'Reflections on typology and techniques in the Palaeolithic.' *Arctic Anthropology*, **6**, 1

Bordes, F. and Crabtree, D., 1969. 'The Corbiac blade technique and other experiments', *Tebiwa*, **12**, no. 2, 1

Clark, J. G. D., 1932. *The Mesolithic age in Britain*

Clark, J. G. D., 1934a. 'A late Mesolithic settlement site at Selmeston, Sussex.' *Ant. J.*, **14**, 134

Clark, J. G. D., 1934b. 'The classification of a microlithic culture: the Tardenoisian of Horsham.' *Arch. J.*, **90**, 52

Clark, J. G. D., 1954. *Excavations at Star Carr: an early Mesolithic site at Seamer, near Scarborough, Yorkshire*

Clark, J. G. D., 1955. 'A microlithic industry from the Cambridgeshire Fenland.' *PPS*, 21, 3

Clark, J. G. D., and Rankine, W. F., 1939. 'Excavations at Farnham, Surrey (1937-38).' *PPS*, **5**, 61

Dines, H.G. and Edmunds, F. H., 1929. *The geology of the country around Aldershot and Guildford. (Geol. Surv. Mem. 285)*

Halahan, B. C., 1926. 'Chiddingfold: find of flints.' *SyAC*, **36**, 122

Halahan, B. C., 1927. 'Flint sites at Chiddingfold.' *SyAC*, **37**, 239

Hooper, W., 1933. 'The pygmy flint industries of Surrey.' *SyAC*, **41**, 50

Leakey, L. S. B., 1951. *Preliminary excavations of a Mesolithic site at Abinger Common, Surrey.* (Research Papers of the SyAS, 3)

Oakley, K. P., Rankine, W. F. and Lowther, A. W. G., 1939. *A survey of the prehistory of the Farnham district.* Prepared for SyAS

Rankine, W. F., 1936. 'A Mesolithic site at Farnham.' *SyAC*, **44**, 25

Rankine, W. F., 1938. 'Tranchet axes of south-western Surrey.' *SyAC*, **46**, 98

Rankine, W. F., 1948. 'Some remarkable flints from West Surrey Mesolithic sites.' *SyAC*, **49**, 6

Rankine, W. F., 1949. 'Mesolithic chipping floors in the wind-blown deposits of West Surrey.' *SyAC*, **50**, 1

Rankine, W. F., 1951. *A Mesolithic survey of the West Surrey Greensand.* (Research Papers of the SyAS 2)

Rankine, W. F., 1952. 'A Mesolithic chipping floor at Oakhanger, Selborne, Hants.' *PPS*, **18**, 21

Rankine, W. F., 1953 'Mesolithic research in East Hampshire: the Hampshire Greensand.' *Papers and Proc. of the Hampshire Field Club and Arch. Soc.*, **18**, Part 2, 157

Rankine, W. F., 1956. *The Mesolithic of Southern England.* (Research Papers of the SyAS, 4)

Rankine, W. F., 1961. *A Mesolithic flaking floor at Oakhanger, Selborne, Hants.* Epitomised supplement to the abstract of the report published in the *PPS*, 1960. Circulated for the information of research workers, January, 1961.

Rankine, W. F. and Dimbleby, G. W., 1961. 'Further excavations at Oakhanger, Selborne, Hants: Site VIII.' *Wealden Mesolithic Research Bull.*, 1961

Rankine, W. F. and W. M., 1960. 'Further excavations at a Mesolithic site at Oakhanger, Selborne, Hants.' *PPS*, **26**, 246

Sonneville-Bordes, D. de et Perrot, J., 1954. 'Lexique typologique du Paléolithique supérieur. *Bull. de la Société Préhistorique Française*, **51**, 327

Sonneville-Bordes, D. de et Perrot, J., 1956. 'Lexique typologique du Paléolithique supérieur.' *Bull. de la Société Préhistorique Française*, **53**, 35

Tixier, J., 1963. *Typologie de l'Epipaléolithique du Maghreb.*

Wainwright, G. J., 1961. *The Mesolithic period in South and West Britain.* Thesis for the Ph.D. degree submitted to the University of London

Wood, E. S., 1947. 'Prehistoric settlement at Farnborough, Kent.' *Arch. Cant.*, **60**, 122

Wood, E. S., 1952. 'Abinger Hammer.' *SyAC*, **52**, 23

Wood, E. S., 1955. 'Abinger Hammer.' *SyAC*, **54**, 136

This paper is published with the aid of a generous grant from the Council for British Archaeology

Fig. 14. Geological map of west Surrey, east Hampshire and north-west Sussex, showing distribution of Mesolithic sites. Based on the Geological Survey.

Scale: 0 1 2 miles

Alluvium
Gravel
Eocene deposits
Chalk
Upper Greensand
Clay
Lower Greensand: Folkstone Beds, Hythe Beds
Lower Greensand: Bargate Beds
Tunbridge Wells Sand

KEY TO FIGURE 14.

1. Abinger Hammer
2. Abinger Common
3. Alma Nursery
4. Barford
5. Beeding Wood
6. Blackheath
7. The Bluff, Tilford
8. Bron-y-de
9. Brook, Albury
10. Buckland Corner
11. Caesar's Camp
12. Cemetery Allotment
13. Chapel Field
14. Chiddingfold, Goldhorde Field
15. Chiddingfold, Prestwick Farm
16. Chiddingfold, Riddingsfield
17. Cockshott Hollow
18. Colgate
19. Crooksbury Hill
20. Cutt Mill
21. Farley Heath
22. Farnham
23. Fir Hill
24. Frensham Great Pond North
25. Frensham Great Pond South
26. Furze Hill
27. Green Lane
28. Halt
29. Heath Brow
30. Hillbury
31. Holmbury Hill
32. Kettlebury I
33. Kettlebury II
34. Leith Hill
35. Leith Hill South
36. Lion's Mouth I
37. Lion's Mouth II
38. Monks' Walk
39. Moor Park A
40. Moor Park B
41. Munstead Heath
42. New Faygate
43. Newstead
44. Oakhanger
45. Old Faygate
46. Pitch Hill
47. Princess Royal
48. The Ranges
49. Reigate Heath
50. Rock House
51. Rodsall
52. Roffey Small
53. Seale District
54. Shalford Common
55. Sheephatch
56. Six Bells
57. Snailslynch
58. St. Catherine's Hill
59. St. Martha's Hill
60. Tilford District
61. Trottsford Farm
62. Trunley Heath
63. Tyting Farm
64. Van Moor
65. Warnham
66. Weston Wood
67. Woolpit
68. Wotton Common