PALAEOLITHIC ARTEFACTS FROM THE GRAVELS OF THE HOO PENINSULA

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INTRODUCTION

A small number of Lower Palaeolithic artefacts have recently been discovered in a working pit at Shakespeare Farm, St. Mary's Hoo (N.G.R. TQ 814774), which exploits a gravel deposit mapped by the Geological Survey (New Series, Sheet 272) as '3rd Terrace'. This gravel caps the ridge between the present Thames and Medway estuaries, so it is not immediately clear to which river it belongs. The artefacts comprise two hand-axes, a core and a flake. One hand-axe was discovered *in situ* in the working face of the gravel pit. This is the first record of *in situ* material from the gravel of the Hoo Peninsula and has important implications for Pleistocene/Palaeolithic chronology in the Lower Medway basin.

PREVIOUS DISCOVERIES OF PALAEOLITHS ON THE HOO PENINSULA

The gravels of the Hundred of Hoo have received comparatively little attention from geologists and archaeologists and as a result few records of Palaeoliths from this district exist. Whitaker (1889, 442) reported three hand-axe finds in the St. Mary's Hoo – Allhallows area, while Roe (1968a) recorded a hand-axe from St. Mary's Hoo in the British Museum (possibly one of the above three). An Acheulian hand-axe found on the beach at Allhallows (Tester, 1978) may have been washed out of the gravels covering higher land to the south.

THE GRAVELS OF THE DISTRICT (Hoo Gravel Formation)

There have been three attempts at establishing a terrace stratigraphy in the Lower Medway basin, by Cook and Killick (1924), Hutchings

(1925) and Dines, Holmes and Robbie (1954). Of these, the first two concentrated on the Medway Towns area and only the last attempted a subdivision of the gravels of the Hoo Peninsula. Dines *et al.* recognised here four numbered terraces, descending approximately from north-west to south-east, i.e. towards the present Medway estuary (New Series, Sheet 272). Recent work in the area (Bridgland, 1983) has revealed that most of these terraces are in fact composite and that at least seven separate aggradations can be recognised (Fig. 1). Since it is the deposits which have been studied, rather than their surface expressions, names have been applied to the various gravels themselves (Fig. 1). Where well-preserved former flood-plain surfaces occur above these aggradations these may be given appropriate terrace names (e.g. Shakespeare Terrace, Stoke Terrace).

Analysis of the gravel composition has generally revealed only local and southern lithologies in these deposits, the latter including significant amounts of Hastings Beds material from the central Weald. This indicates that these gravels, collectively termed the Hoo Gravel Formation, were deposited by the River Medway. They are in marked contrast to the gravel covering much of the Isle of Grain, which contains a significant far-travelled component and is thought to

Formation	Individual gravel aggradation	Surface elevation (projected surface elevation), Hoo/Allhallows area	Location
Low Level East Essex Gravel Formation +	Grain Gravel	13m O.D.	Isle of Grain
*	Halling Gravel	(near O.D.)	Upstream from Medway towns
Hoo Gravel Formation	Binney Gravel	8m O.D.	Hoo Peninsula
	Stoke Gravel	16m O.D.	
	Newhall Gravel	22m O.D.	
	Shakespeare Gravel	35m O.D.	
	Dagenham Farm Gravel	45m O.D.	
	Clinch Street Gravel	50m O.D.	
	High Halstow Gravel	60m O.D.	
	Lodge Hill Gravel	72m O.D.	(Residual hill-capping)
*	Cobham Park Gravel	(130m O.D.)	N.Downs dip-slope

* The gravels of the area upstream from the Hoo Peninsula have not been studied in detail. Results from Cobham Park suggest that all Medway deposits between the North Downs and the Thames Estuary have a similar composition, so to avoid an unnecessary proliferation of terminology it is proposed that aggradations in this area also be assigned to the Hoo Gravel Formation.

\+ Bridgland (1983)

Fig. 1. The Gravels of the lower Medway Basin.

have been laid down by the Thames downstream of its former confluence with the Medway (Bridgland, 1983).

THE SHAKESPEARE GRAVEL

The Shakespeare Gravel is probably the best developed aggradation on the Hoo Peninsula. It comprises the majority of spreads mapped as '3rd Terrace' by the Geological Survey and can be traced (Fig. 2) from the Frindsbury area to the type site, Shakespeare Farm Pit, where its surface is at *c.* 33 m. O.D. The gravel patch at Slough Fort, Allhallows (N.G.R. TQ 837785), mapped as '2nd Terrace' is here considered to be an eroded remnant of Shakespeare Gravel (Figs. 2 and 3). Gravel mapped as '3rd Terrace', but considerably above the general level of the Shakespeare Gravel, at St. Mary's Hoo (N.G.R. TQ 807766; surface at 45 m. O.D.) and near Dagenham Farm (N.G.R. TQ 830776; surface at 41 m. O.D.), is here interpreted as an earlier, higher aggradation, the Dagenham Farm Gravel (Figs. 2 and 3). The two remnants of this aggradation are separated by the thick spread of Shakespeare Gravel at the latter's type site, the Dagenham Farm remnant apparently representing a meander core (Fig. 2).

The Shakespeare Gravel displays a combination of sediment types and sedimentary structures which indicate that it is the result of a braided fluvial environment (Bridgland, 1983), strongly suggesting deposition under cold conditions. This is the only one of the various Medway aggradations on the peninsula which is sufficiently thick to be commercially exploited for aggregate at the present time. It reaches the considerable thickness of 10 m. in parts of Shakespeare Farm Pit, the thickness varying across the quarry, reflecting the fact that the gravel occupies a large channel cut into the London Clay, the 'Shakespeare Channel' (Fig. 4). The gravel is also exploited at Barn Street Pit, immediately to the south, where its thickness suggests that the Shakespeare Channel is again represented.

The Shakespeare Channel has been traced downstream, across the present Thames estuary, to eastern Essex, where it is believed to broadly correlate with similar features beneath Thames-Medway gravel at Southend, Burnham-on-Crouch and, ultimately, with the Clacton Channel (Bridgland, 1983). This major channel system can also be traced upstream of the Thames-Medway confluence into the Thames Valley, where, it is suggested, it correlates with the Lower Gravel channel at Swanscombe (Bridgland, 1983). The Shakespeare Terrace surface (developed above the Shakespeare Gravel, which infills and overlies the Shakespeare Channel) is considered, on the grounds of elevation, to be the Medway equivalent to the Boyn Hill

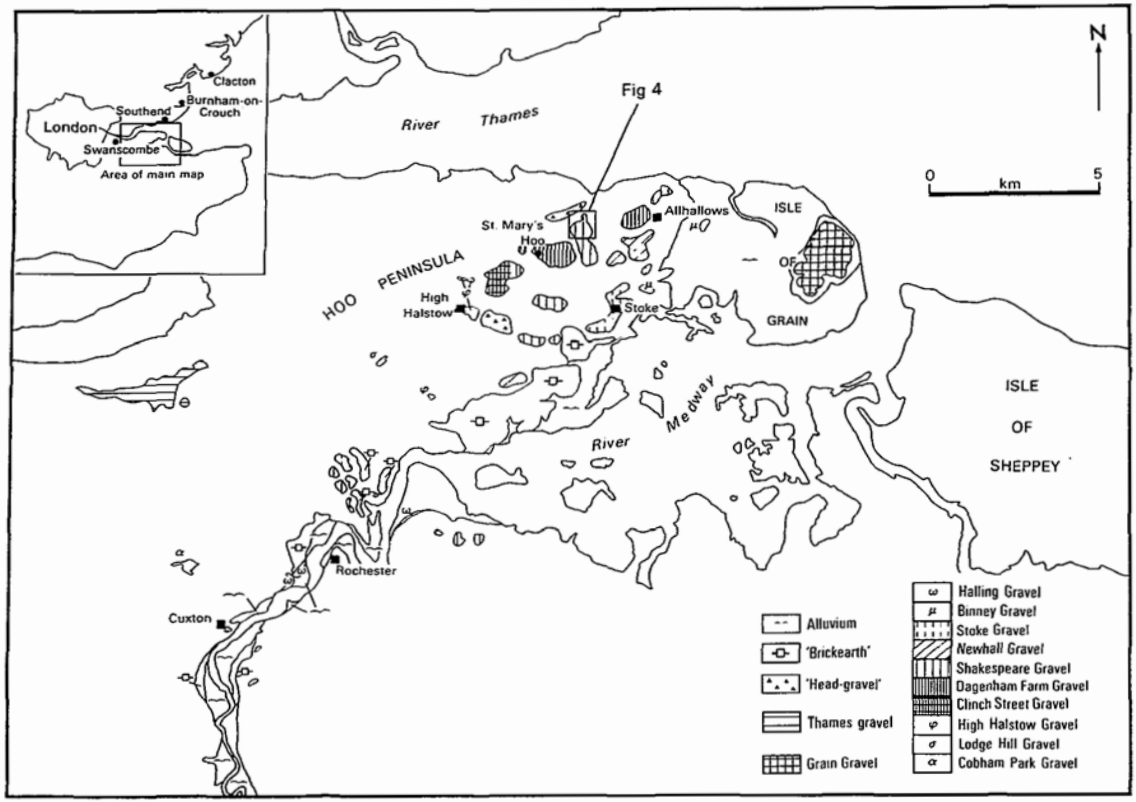

Fig. 2. The Gravels of the lower Medway Basin, showing places referred to in the text (see also inset).

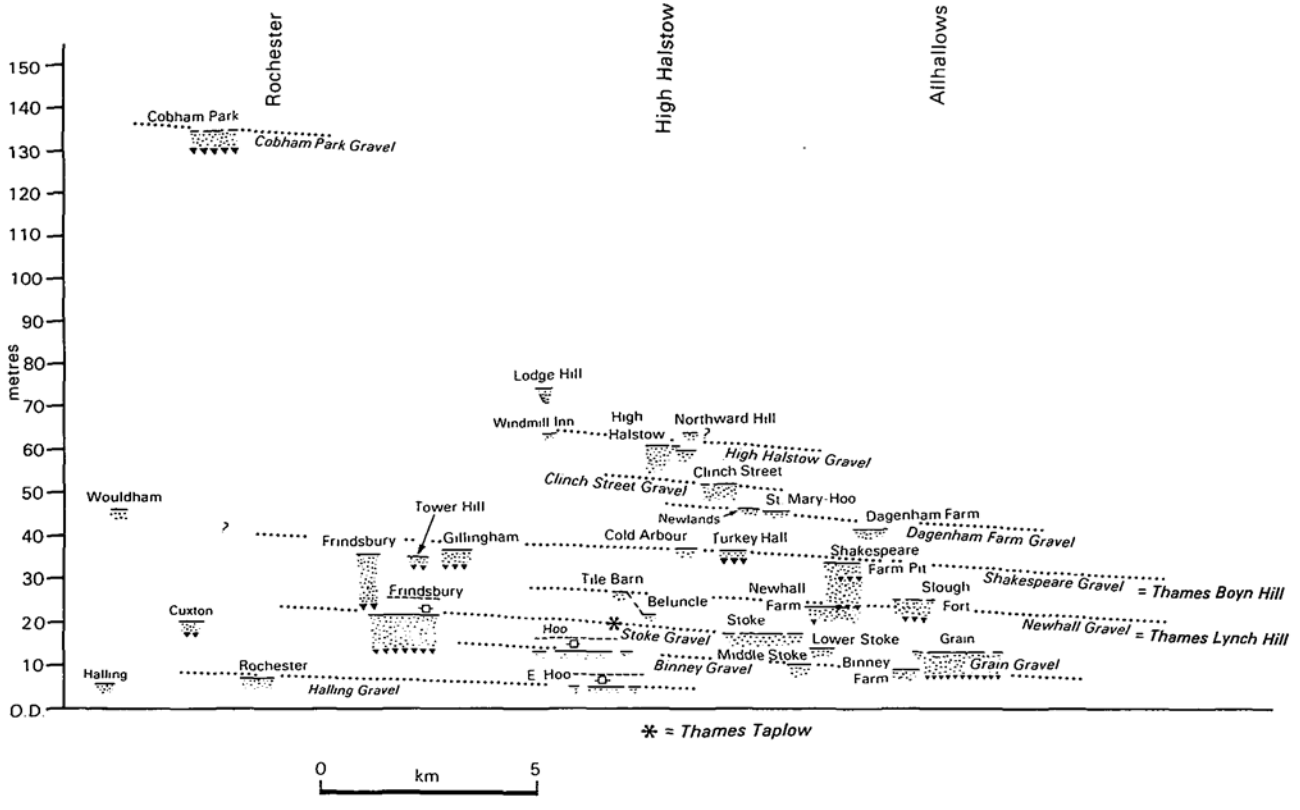

Fig. 3. Long Profiles of Gravel Aggradations in north Kent.

Terrace of the Thames (Bridgland, 1983). The Boyn Hill Gravel, which underlies this terrace in the Thames valley, is a cold stage braided river gravel, probably of early Wolstonian age (Gibbard, in press). The relationship of the interglacial deposits at Swanscombe, often attributed to the Boyn Hill Terrace, to this aggradation remains uncertain.

Interglacial sediments, such as those occurring locally in the Thames-Medway channel at Southend, in the Southminster area and at Clacton, as well as in the equivalent Thames channel at Swanscombe, have yet to be found on the Hoo Peninsula. Where studied, these interglacial sediments are believed to be of Hoxnian age (e.g. Pike and Godwin, 1953; Kerney 1971). Their occurrence at Swans-

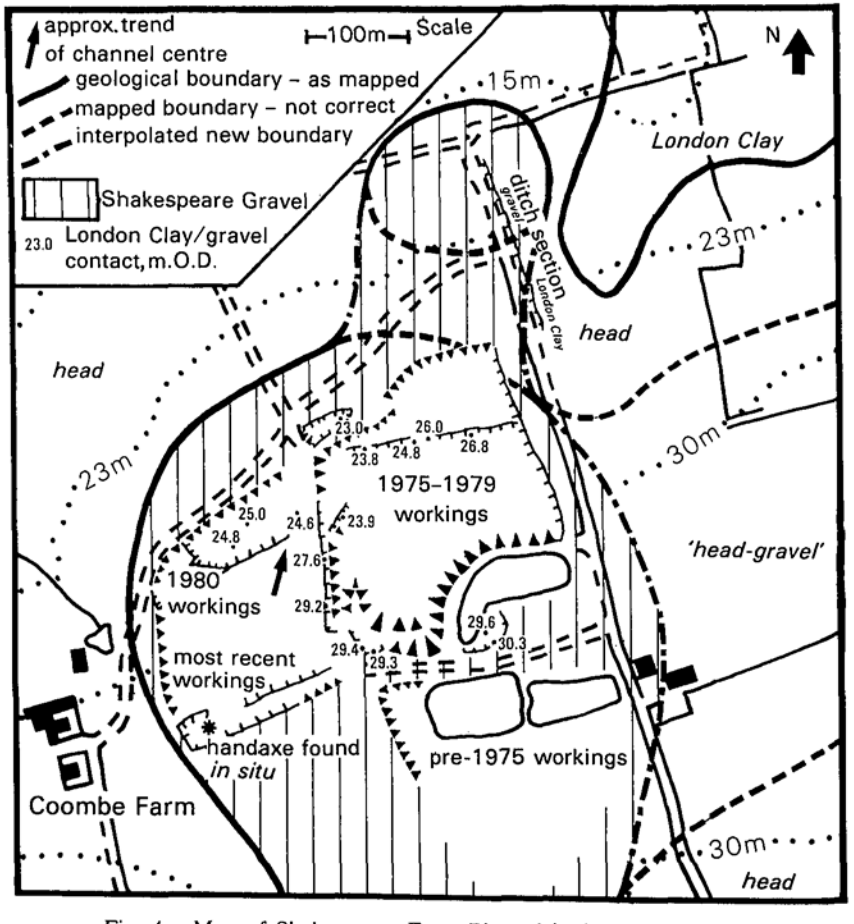

Fig. 4. Map of Shakespeare Farm Pit and its immediate Area.

combe and in Essex indicates that the channel feature must have been excavated early in or prior to the Hoxnian period. Indeed, the succession in eastern Essex strongly suggests that the channel was in fact cut by the Thames immediately after its diversion, by ice, into the former Medway valley north of Southend, an event known to have taken place during the Anglian glaciation (Bridgland, 1983). In the Middle Thames, the immediate post-diversion Thames is associated with a higher, pre-Boyn Hill aggradation, the Black Park Gravel (Gibbard, 1979). This aggradation slopes steeply downstream and is believed to have fallen below the Boyn Hill surface before reaching the Thames-Medway confluence. It is therefore represented by the lower part of the channel-fill in eastern Essex. This suggests that the lower part of the deposits filling the Shakespeare Channel may be a late Anglian Medway equivalent of the Black Park aggradation.

THE ARTEFACTS (Figs. 5–6)

Hand-axe (1): This hand-axe was found by Mr. R.D. Welham in September 1977 at the washing plant of the pit. It was presented to Rochester Museum (Dep. no. 710) and registered as a leaf-shaped stone tool. Typologically, it is a proto-limande (Bordes 1961, 63) or elliptical ovate (Type GK of Wymer 1968, fig. 27). A small thermal scar on one side of the implement, truncated by flaking, suggests that the nodule contained incipient thermal fractures at the time of manufacture. It is stained orange and is in a rolled condition (Wymer 1968, Pl. XI), with considerable crushing of the edges. There are no remnant cortical patches.

The hand-axe measures 128 mm. long, 63 mm. wide, and 40 mm. thick. It is likely that the manufacturing process broadly followed that described by Newcomer (1971) and Bradley (in Sampson, 1978) i.e. *rough shaping, thinning and shaping, and finishing.* It shows considerably more refinement than hand-axe 2 (see below) although the deep, non-invasive flake scars are consistent with hard hammer percussion (Ohnuma and Bergman, 1984). The fact that flakes have been removed from the thick main central ridge of the hand-axe, where the angle is unsuitable for percussion, indicates that thinning may have been a problem. The use of a hard stone hammer inhibits large-scale thinning, which may explain why the hand-axe is so narrow, i.e. the edges were reduced during the attempts to produce invasive flakes. There is no recognisable butt, as the edges, which are convex in plan, converge to form regular rounded ends.

Hand-axe (2): This ficron (Bordes, 1961, 57–8) or type DF pointed hand-axe (Wymer, 1968, 48) was found *in situ* in the working face of

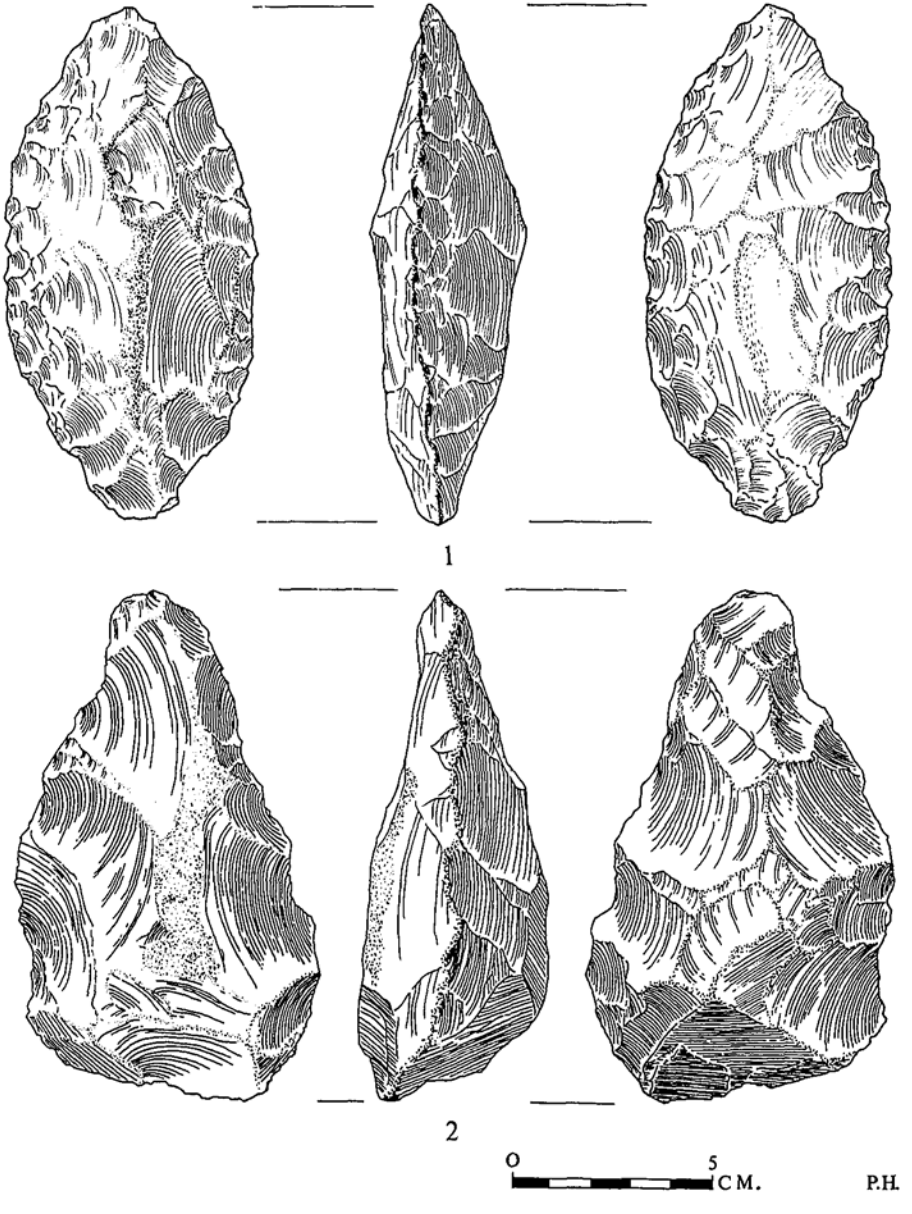

Fig. 5. Flint Axes (Scale: $\frac{1}{2}$)

the pit, approximately 1.5 m. above the London Clay surface. It is made from flint which contains thermal fractures. These fractures do not appear to have been serious enough to affect the knapping quality of the flint. The hand-axe is stained a uniform olive green, preventing a detailed description of the true colour and texture of the flint. It is in a rolled condition and most flake surfaces are covered by closely-spaced incipient cones of percussion, which probably result from gravel collision in the river.

The hand-axe measures 128 mm. long, 77 mm. broad and 45 mm. thick. It is notable for the simplicity of its manufacture rather than for its degree of refinement. It has been produced by simple roughing out and basic shaping. This has resulted in a crude sinuous edge which has not been modified by thinning and finishing. Newcomer (1971) described the production of hand-axes to a similar stage taking 20 to 40 blows. The two sides of this completed hand-axe have not more than 15 major flake scars. As with hand-axe 1 the negative flake scars stop short of the centre of the hand-axe and a small patch of cortex remains. Production of hand-axes to this stage often involves some alternate flaking, although this hand-axe appears to have none. The two edges, one convex, the other nearly straight, converge to a thick, flat tip. The butt is untrimmed, flat and formed by a thermal fracture.

Core (3): This multi-platform flake core was found at the base of the working face on a machined gravel platform, immediately above the London Clay surface. It was probably not *in situ*, but there can be little doubt that it has come from the gravel in the immediate vicinity. It is made from a rounded flint nodule which has a creamy weathered cortex. The flint has a mottled orange-olive green staining and is in a rolled condition. Most flake surfaces show the closely-spaced incipient cones of percussion which result from gravel collision. However, it is conceivable that some, near the platform edge, are miss-hit percussion blows formed prior to the rejection of the core. Such features have been found on Clactonian cores at both Globe Pit, Little Thurrock (Wymer, 1957, 167) and Clacton (Singer, Wymer, Gladfelter and Wolff, 1973, 39).

Most of the striking platforms on the core are formed by the negative flake scars of previous removals rather than by deliberate platform construction flakes. Platform preparation, by faceting of the striking platform to modify the flaking angle or abrasion of the platform to remove overhang and allow percussion near the core edge, is absent. All the flake scars have deep negative bulbs and pronounced points of percussion, both in keeping with a hard hammer mode (Ohnuma and Bergman, 1984). Such unprepared hard hammer-struck flakes are typical of those found in Clactonian

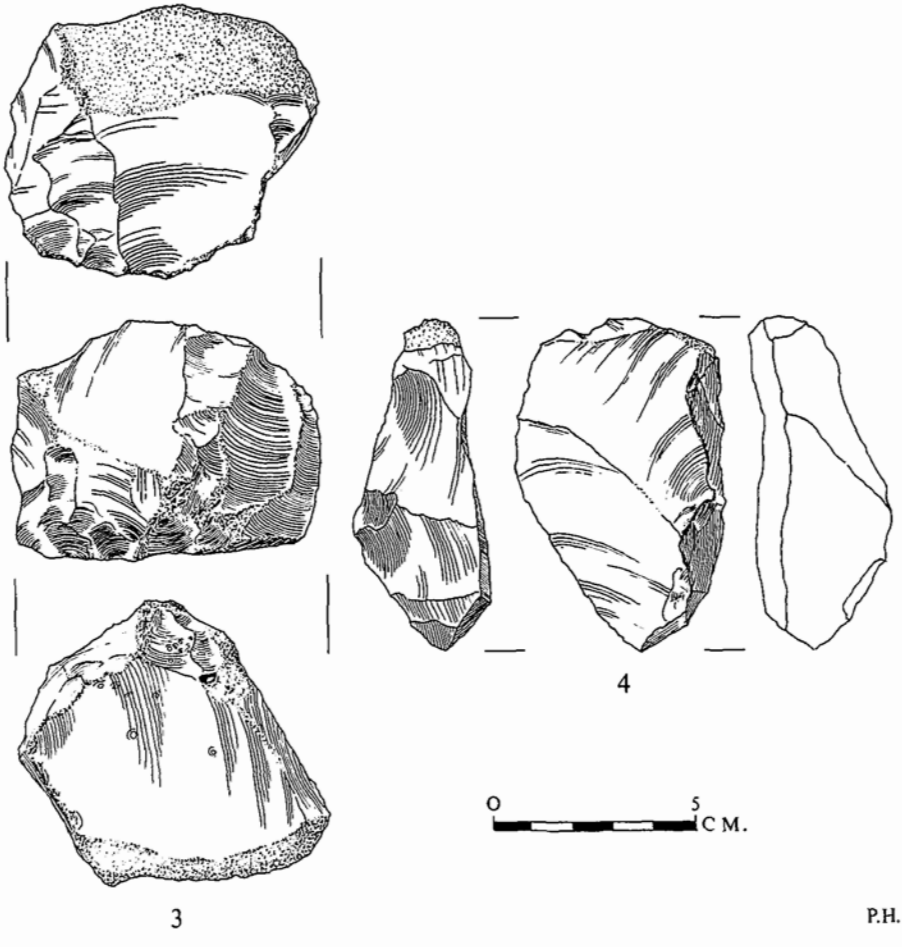

Fig. 6. Flint Artefacts (Scale: $\frac{1}{2}$)

industries. Flake production from the core cannot be calculated accurately, but at least 10 major flake scars are present. The process of continuous flaking in a single direction, without modification, causes the flaking angle to increase rapidly (Warren, 1951, 120), leading ultimately to the flaking surface becoming unworkable. The core is then rotated and flaking recommenced from a fresh platform. When all platforms are unworkable, the core is rejected. This core demonstrates the above sequence exactly.

Although the features described above are not exclusive to Clactonian cores, they are fully in keeping with examples from this industry

(e.g. Chandler, 1930, fig. 7). A large proportion of Clactonian cores are produced by alternate flaking, but cores of the Shakespeare type also occur.

Flake (4): The unretouched flake was found by Mr. J.J. Wymer at the washing plant of the pit. It is similar in condition and colour to the other artefacts although the dorsal surface has a thin light-blue patina.

The flake is 74 mm. long, 58 mm. wide and 33 mm. thick. It has a plain unprepared butt and has been detached by hard-hammer mode (Ohnuma and Bergman, 1984). The pattern of flake scars on the dorsal surface indicates that the flake has not been struck from a prepared core. Instead, the proximal ends of the negative flake scars intersect along the central axis at an angle of 90°. Such a flake results when a core similar to (3) is rotated during 'rejuvenation'. However, flakes of this type can also result from hand-axe production during the basic shaping of the butt. It is therefore not possible to assign an accurate date or origin to this flake, although it does not contradict the evidence of the other pieces.

All the finds described have been deposited in the Rochester Museum.

DISCUSSION

The small number of artefacts from this pit appear to represent two distinct technologies, the flake/core tradition of the Clactonian and the hand-axe (core tool) technology of the Acheulian. All the material is rolled and has clearly been incorporated into the fluvial deposit at some point or points upstream, either directly or by re-working from an earlier deposit. It is quite possible that all the pieces had different origins of this type, despite the general similarities of their condition.

At present, it is not possible to determine how far the artefacts have travelled in the bed-load of the river, but recent experiments (Harding, Gibbard, Lewin, Macklin and Moss, in press) have shown that the condition of a hand-axe may be altered radically in as little as 100 m. transport under such circumstances; indeed, incipient cones of percussion and edge damage similar to that found on all the Shakespeare artefacts can be present after as little as 38 m. transport.

The occurrence of Acheulian and Clactonian artefacts together in the Shakespeare Gravel is thoroughly in keeping with the geological interpretations outlined above. The Black Park Gravel of the Middle Thames has yielded, in the Caversham channel, a similar mixed

assemblage (Wymer, 1956, 1968). The interpretation of these gravels as Black Park follows Gibbard (in press). Furthermore, the Clactonian industries in the Lower Gravel at Swanscombe and in the Clacton Channel gravel are both in deposits associated, according to the geological correlation outlined above, with the Black Park Terrace, which implies a late Anglian age (Gibbard, 1979); both have, in fact, been ascribed to the early Hoxnian (Kerney, 1971), Pike and Godwin, 1953), although the basal gravel may be late Anglian (Singer *et al.*, 1973). The upper part of the Shakespeare aggradation, if correctly linked with the early Wolstonian Boyn Hill Gravel, post-dates the Hoxnian Acheulian industries of Swanscombe and Hoxne.

This interpretation implies a major break in the depositional succession at Shakespeare Farm Pit, which has not, however, been identified. In a sequence of this type, made up of a number of very similar sand and gravel units, many separated by erosion surfaces, such a break would be very difficult to identify. In support of the interpretation is the similarity, both in terms of technology and typology, between the pointed hand-axe from Shakespeare Farm Pit and similar artefacts from the Swanscombe Middle Gravel (Wymer, 1968, fig. 102, no. 256). Given the minimal quantity of material from the former, the current absence of Levallois technique from both sites is in keeping with this interpretation.

The relationship between the Shakespeare Gravel and the prolific Acheulian industry from Medway gravel at Cuxton (Tester, 1965) is of considerable interest. The similarity of the Cuxton artefacts to those from the Swanscombe Middle Gravel is well established (Tester, 1965). As this implies, there are similarities between the Shakespeare Farm material and that from Cuxton, where there were also thick hard-hammer struck pointed hand-axes associated with similar narrow ovates (Roe, 1968b, 77, fig. 8). It has also been recognised that the Cuxton site is too low to directly correlate with Swanscombe (Tester, 1965; Roe, 1981). Confirmation of this can be found in Fig. 3, which shows the position and the elevation of the Cuxton site in relation to the various aggradations of the Hoo district. Rather than relating to the Shakespeare Gravel (of similar age to the Swanscombe Middle Gravel) or even the succeeding Newhall Gravel (=Thames Lynch Hill – Fig. 1), the Cuxton site apparently belongs to the Stoke Gravel of the Lower Medway, which is correlated with the Taplow gravel of the Middle Thames (Fig. 3; Bridgland, 1983). If Cuxton, and therefore the Stoke Gravel, were to be correlated with Swanscombe, Palaeolithic material would not be expected to occur in an aggradation two stages higher within the Medway Sequence (i.e. the Shakespeare Gravel). The occurrence of artefacts in the

Shakespeare Gravel, therefore, strongly refutes a direct correlation between Swanscombe and Cuxton.

CONCLUSION

A number of unrefined, hard hammer-produced artefacts have been recovered from Shakespeare Farm Pit, St. Mary's Hoo. Their discovery provides important evidence for dating the fluvial deposits of the Lower Medway and correlating these with those of the Thames. The very presence of artefacts in the Shakespeare Gravel implies a Late Anglian or post-Anglian age for the deposit. This is in keeping with altitudinal correlation between the Medway and Thames systems with equates the Shakespeare Gravel with both the Black Park and the Boyn Hill Gravel and the Shakespeare Terrace surface with that of the Boyn Hill Terrace.

ACKNOWLEDGEMENTS

The authors wish to thank a number of people who have assisted the fruition of this work; firstly, the owners of Shakespeare Farm Pit and their employees, who have always allowed free access to visiting geologists and archaeologists; secondly, for reading the text and providing constructive discussion, Dr. Peter Allen, Dr. Mark Newcomer and Dr. Richard Tipping; thirdly, for typing the manuscript, Paula Blackford. D. Bridgland wishes to acknowledge a Research Assistantship at the City of London Polytechnic, funded by the Inner London Education Authority, under which research on the gravels was carried out. He is also grateful to the above institution for allowing him extensive use of their facilities and, in particular, to Mr Ed. Oliver of their Cartographic Unit (Department of Geography), who drew Figs. 1–3.

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