

A LATE UPPER PALAEOLITHIC CALCULATOR (?), GOUGH'S CAVE, CHEDDAR, SOMERSET

by
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ABSTRACT

Numerous bone points of Late Upper Palaeolithic Date were found during the excavations conducted by Parry, 1927-1928, at Gough's Cave. One of these bore man-made notches and was described by Gray as a tally. It is this particular point that is reconsidered here.

INTRODUCTION

Parry conducted excavations in the entrance passage of Gough's Cave, Cheddar. In the Late Pleistocene/Late Upper Palaeolithic portions of the deposits he found material which was assigned to the Creswellian on the basis of the flint industry. The estimated date was stated to be about 12,000 B.P. or perhaps a little younger (Tratman, 1975, p. 19). In the course of the excavations "over 7,000 flints" were found and of these 947 showed supplementary working" (Parry, 1931, p. 47). But in the early 1960s only 760 implements and 1517 fragments remained in the museum at the cave (Tratman, 1975, p. 19). Most of these came from Parry's layers 10-14. In addition to the flints there were numerous bone points varying from very stout heavy ones to minute ones made from splinters of bone. Of these bone points 8 had been made from the tibiae of hares. The total quantity of worked bone items from Gough's Cave is far greater than that from any other site of similar age in Britain.

Parry did his digging in layers of 6 in. taken parallel to the existing surface. Only a small scale plan of the areas excavated accompanied Parry's report. No plan showing the position of individual finds, or drawn section was ever published by Parry. None of his notebooks can now (1976) be found, nor his catalogue, which was still in existence about 1950. However Parry did record, in pencil, his layer number on most of the specimens and so it is possible to place the bone point to be described, in layer 12. This is in the middle of the main occupation period as indicated by the number of finds (*fig. 33*).

THE BONE POINT

The point was briefly described and poorly figured by Gray (1931, *fig. 2.1*). He used the term "tally" for it. For this term I have substituted "Calculator (?)".

The point was made from the tibia of a hare. A young animal as the head epiphysis was not completely fused to the shaft. The initial purpose was to

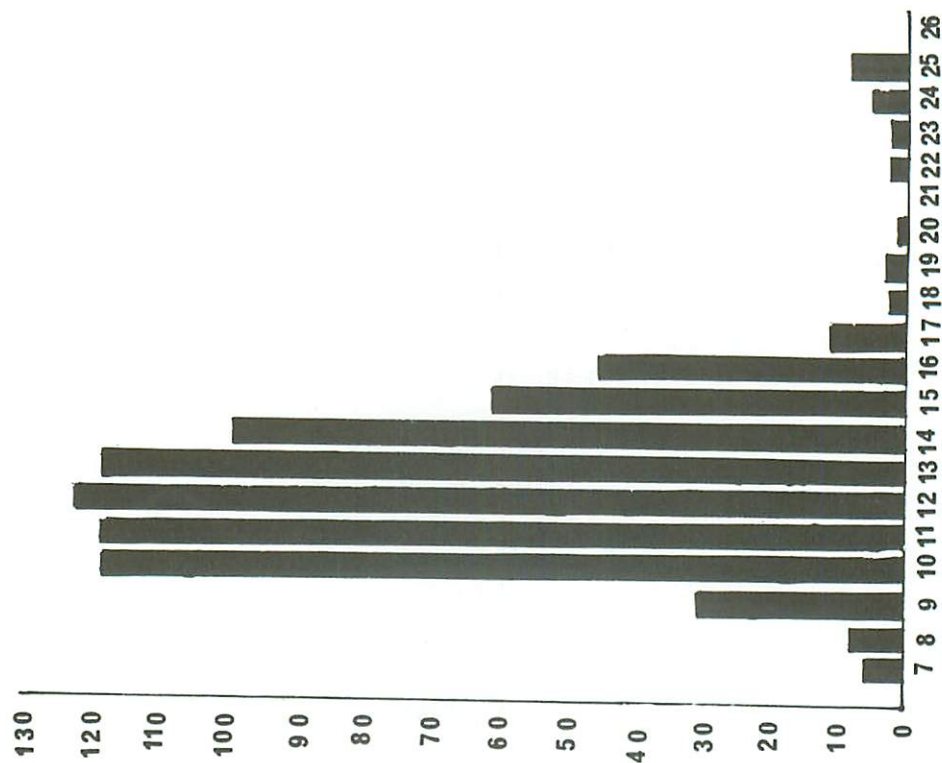
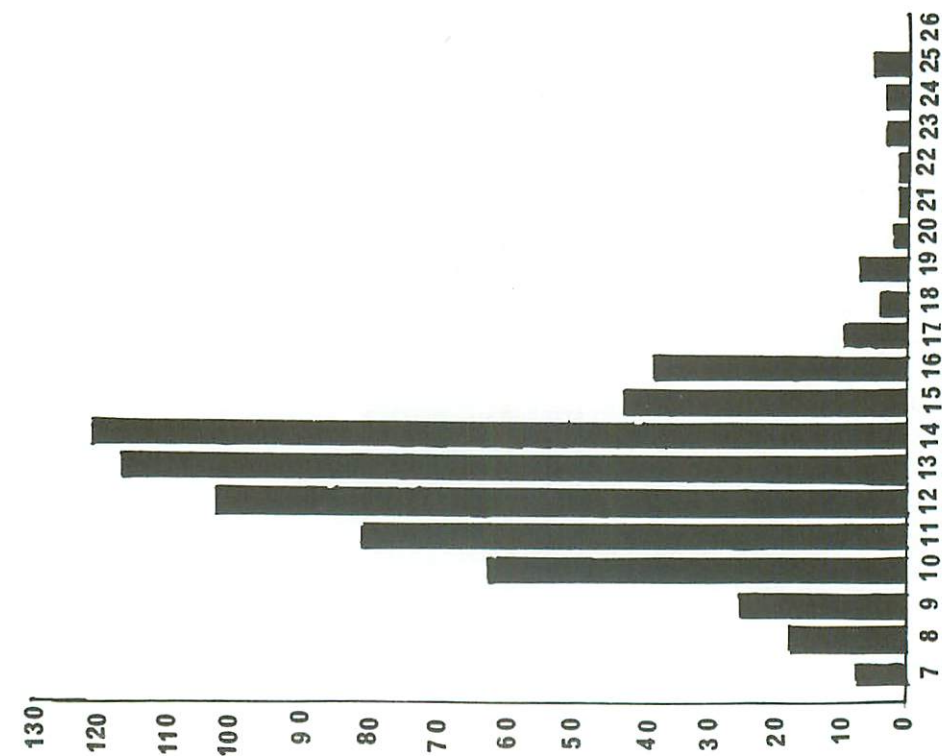
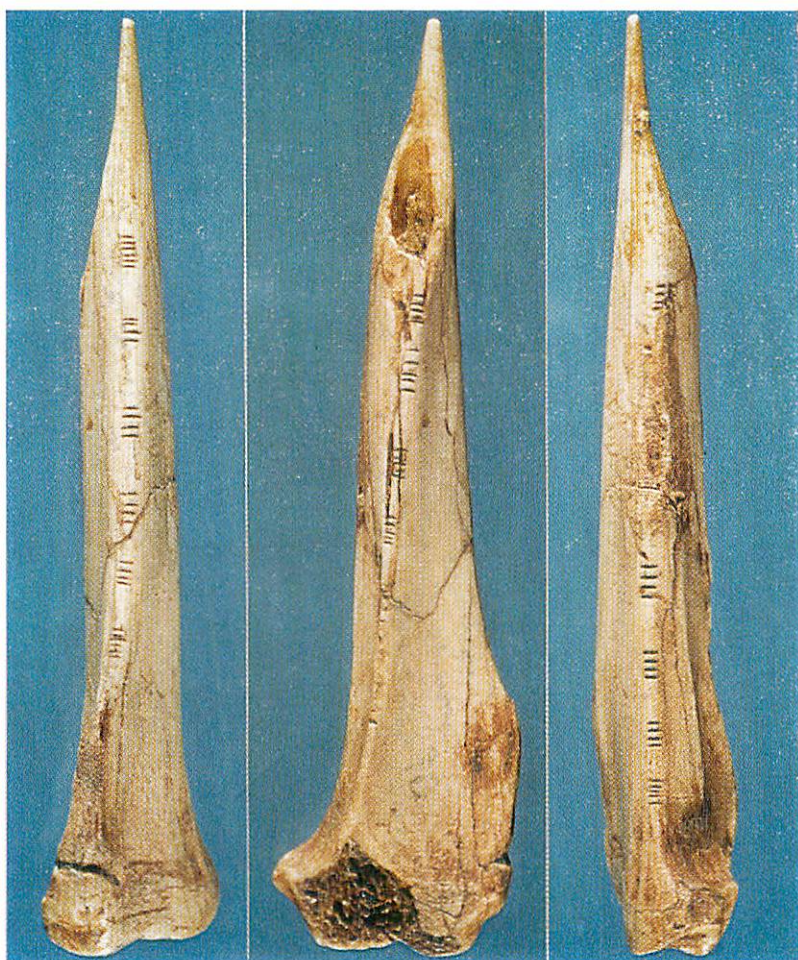


Fig. 33.1, 33.2 Histograms of layer distribution of the flints, left, and -bone implements, right, from Gough's Cave.



cm

Plate 13 Three views of the Calculator. Left: anterior border. Centre: external border. Right: internal border. Sc. in cms. Photograph: Robin Godwin.

make a bone point, one of eight from the tibiae of hares. The distal end of the bone was removed, presumably by cutting as there is no splintering, such as would occur if the end was removed by bashing. Presumably the sloping pointed end was finished by grinding and polishing. This third stage in manufacture removed all traces of cut facets and grinding. The polishing might have resulted from the process of manufacture or from use. Probably the former as the head shows a lesser degree of polishing than the shaft of the point. Polishing by use should have given the head a greater polish than the shaft.

Subsequently the bone was marked with a series of cuts arranged in groups. These cuts show no signs of obliteration by use or deliberate polishing (Plate 13). After the cuts were made the bone ceased to be used as a point.

The tibia of a mammal such as the hare has a triangular cross section along the length of the shaft so that there are three ridges or borders along the length of the bone. The ridges are designated anterior, internal and external. The cut marks are shallow nicks set at right angles to the line of the ridges. They appear in spaced groups of 4s, 5s and 6s, though all three numbers do not appear on any one ridge. The internal and external ridges have suffered damage while the specimen was in the earth. A suggested restoration is shown in figure 33.3.

The arrangement of the groups is shown in plate 7 and figure 33.3. Summed up and counting in each case from the head of the bone there are:-

Internal ridge	5, 4, 4 [damage = probably 3 groups of 4s]	4	= 33
Anterior ridge	6, 4, 4, 4, 4, 6		= 28
External ridge	1 [+ probably 4], 5, 5, 5, 5, 5		= 30

Each group along the anterior ridge occupies the same length within 1 mm. So the 6s are crowded and the 4s well spaced. The spaces between the groups varies between 5.5 and 8.9 mm.

Along the internal ridge there is one group of 5 at the head followed by groups of 4s and the damaged area probably held three more groups of 4. The spacing is not quite so accurately done as along the anterior ridge.

Late Upper Palaeolithic Calculator,
Gough's Cave, Cheddar. Diagram of Cuts.

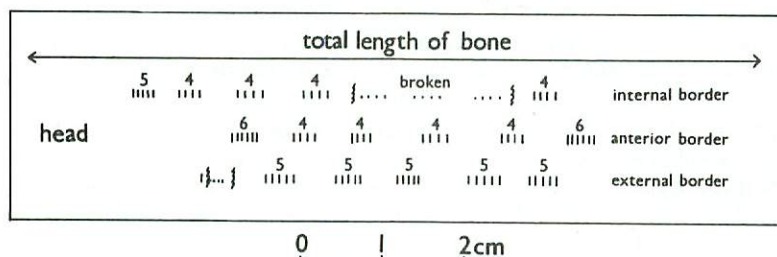


Fig. 33.3. Diagram of Calculator. Dots in broken areas indicate presumed grouping. Drawing by Sheila Watkins.

Along the external ridge the grouping is less accurate still both as to the length of each group and the spacing between the groups. ApSimon, (*in litt*), has suggested that the irregularity within the groups could be due to re-touching after the initial cutting. Allowing for this sequential cutting he has suggested that the original groupings might have been 1 (+ ?4), 4, 5, 4, 5, 4 [27] and not 1 (+ ?4), 5, 5, 5, 5, 5 [30]. This is a possibility and depends on one's personal interpretation of the irregularities.

The reconstruction of the original supposed full notation is shown in figure 33.3. This is based on the hypothesis that changes in the number of cuts in a group will occur at both ends (anterior ridge) or at one end (internal ridge) and not along the middle stretches of the ridges. The relationship of the beginnings and endings of each line of cuts has probably no significance being dependent, it seems, on the anatomy of the bone.

DISCUSSION

The questions to be answered are:-

1. Were the cuts made at the same time or sequentially with time gaps of unknown duration between the different parts of the series.
2. Do the cuts represent simply decoration or
3. Do they represent a form of numerical notation and, if the latter, what purpose did they serve.

The evidence on the first question has been stated above. My own opinion is that all the cuts were made at the same time by a single person. This is an hypothesis that cannot be proved or disproved.

On the matter of decoration one can only look at the specimen and come to a conclusion. Proof will always be lacking. The regularity of the groups, spacing between groups and the variations in the numbers of cuts in each group are minimal. There is also the fact that the bone ceased to be used for its original purpose, as a point, immediately after the cuts were made. All this seems to indicate that the purpose of the cuts was something other than simple decoration.

Dewey (1974) describes two pieces of carved bone from La Grotte de Remouchamps in Belgium. One found in 1902 and the other, a bone splinter, in 1970. His hypothesis is that they were used in gaming, and he adds that the theories of Marshack "concerning lunar phases could not be applied to them". Dewey elaborates his hypothesis at some length noting that games inevitably involve some counting and on his 1970 piece he breaks down the symbols into a numeration based on 5s. The diagrams in figure 34a, b and c are based on his photographs in *World Archaeology* (vol. 5). For the 1902 piece, which is broken, it is a reasonable hypothesis that it represents a numeration system based on 5s though there is one obvious group of 8 holes. The technique is closely allied to that used for the Chelm's Combe piece (*fig. 32, p.119*). Dewey elaborates by a series of hypotheses that his 1970 piece also represents a numeration system based on 5s. He draws attention to the manner in which many, if not all, the transverse cut marks meet the vertical ones with an oblique nick. There are also significant breaks in the series of the transverse and vertical lines.

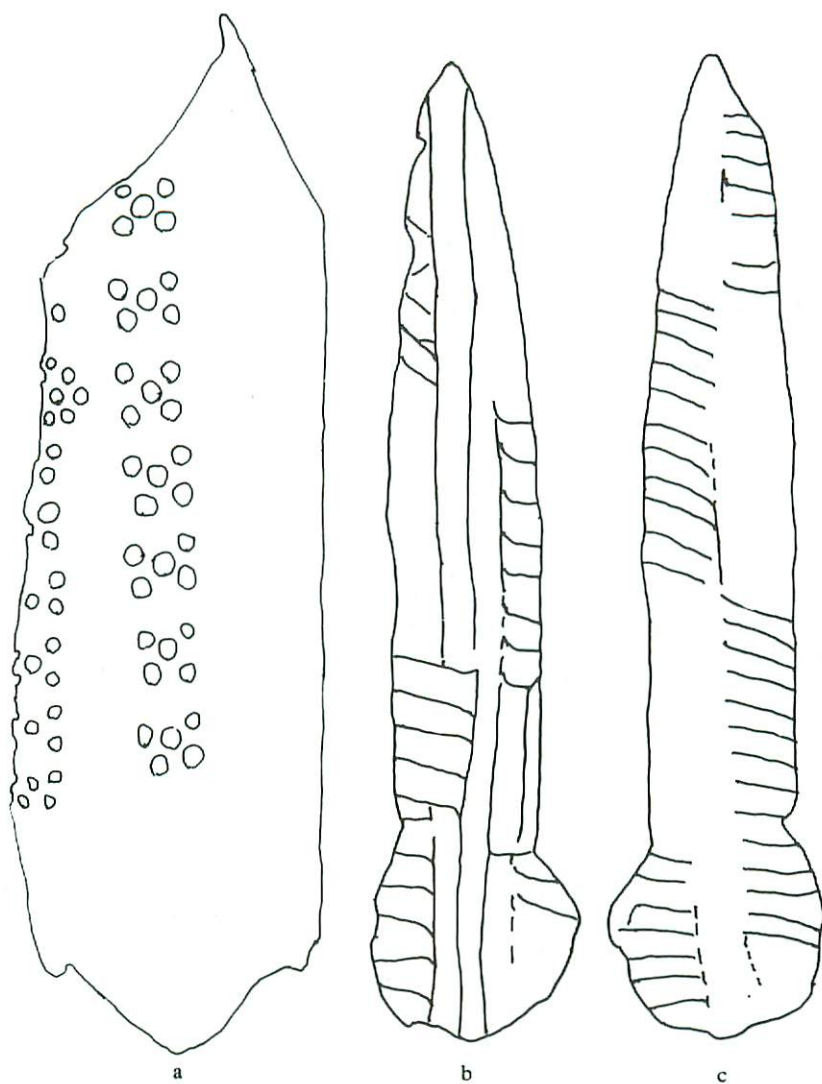


Fig. 34a, b and c. Diagrams of carved bone pieces from La Grotte de Remouchamps, Belgium. Based on Dewey 1974, with the permission of the editors of *World Archaeology*: a, 69mm, b and c 72mm long.

Dewey, however, does not distinguish between an item used as an object in the playing of the game and an item used to keep a record of the game. The former will show signs of use and, if decorated, the decoration will become worn or obliterated. The latter as a record will not show wear.

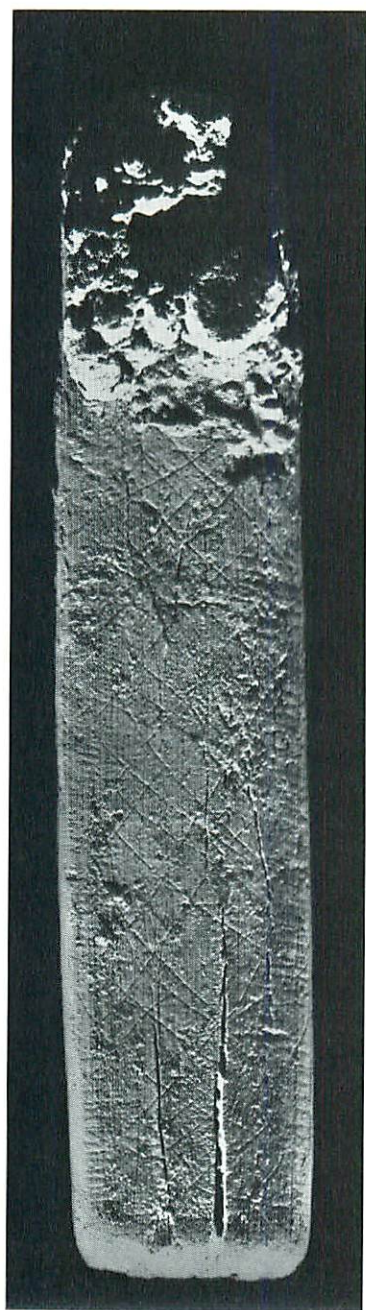
This difference is well illustrated in the decorated rib piece, also from Gough's Cave (*Pl.* 14). This, Powers (in Hawkes, Tratman and Powers 1970) has suggested, was used in a game. A reasonable hypothesis. All the same this bone was selected cut to length and the butt end cut square, (the tip is broken). The long sides were ground till they were nearly parallel. On the convex (outer) surface (*Pl.* 14B) along the centre line and both long sides and across the butt a series of cuts were made. They are arranged in blocks of closely set cuts, which are irregular in length and in the spacing between blocks. On the inner (concave) side there are continuous series of cuts along both long sides and, more faintly, across the butt. The cut marks are irregular, highly so along the left side (*Pl.* 14A), and the space between the sides is filled with an irregular lattice pattern. It is possible that the lattice pattern was added after the cuts were made, but this is not certain.

The hypothesis is that the whole series were made as a decoration. On the other hand it is certain that the piece was used extensively after decoration. The amount of wear on and other damage done to the convex surface is substantial. The central line of cuts has been almost obliterated and the area extensively damaged. There is wear along the sides and across the butt. The concave surface also shows signs of wear to a lesser degree along the sides and across the butt. The central zone is free of wear. The differences between the degrees of wear and the position of the wear can be attributed, with a reasonable degree of certainty, to the anatomical form of the piece.

If this piece was used as an actual object in a game it seems that the game included throwing, spinning on the ground and striking. Speculation as to the actual game played is pointless. The main thing is the striking difference between the worn supposed gaming piece and the unworn bone point.

The bone point could have been used as a sort of score board for a game but not an object used in a game. It could also have been used for recording events of various kinds. The cut marks, assuming that the restoration shown in figure 33.3 is correct, give totals of 28, 30 and 33. The 28 could be taken to represent a lunar month as so often postulated by Marshack but for this there is no proof and the number of cuts along the other borders would seem to contradict this supposition.

Ethnographical parallels may provide a fitting explanation. Such parallels would have to be treated with caution and cannot provide absolute proof but only probabilities. Perhaps there are parallels amongst the Australian aborigines in the use of wood or bone points in magical ceremonies such as killing (*teste* Cranstone, 1973). Or again in the use of message sticks when the messenger carries a notched stick as an *aide mémoire*, the meaning of the notches having been explained to the messenger by the maker, who retains the meaning in his mind. A variation of this is the use of marks on bones to carry information on family or group events, including genealogical information. The translation is again in the mind of the maker



A



B

and can be given out or handed on by word of mouth. The bone remains in its home group and would, presumably, travel with the group in its semi-nomadic existence.

If the hypothesis of numeration is followed, and the author thinks that this is the correct one, then ethnographical parallels are even more difficult to find. The one that comes to mind is the use, as late as the beginning of the C 19, of notched sticks in the English treasury for keeping quite complicated accounts.

CONCLUSIONS

The hypothesis favoured by the author is that some fairly complex system of numeration is displayed on the notched point. What was being calculated is unknown. There are obvious analogies with the two bone pieces described by Dewey and the piece from Chelm's Combe, Cheddar (Harrison, p.117 above). In all these specimens, which are just four out of many recorded from numerous sites in Europe, there are large variations in the techniques used to convey or hold information. The variations could be taken to imply different objectives for the recordings. An hypothesis common to all is that some relatively complex form of numeration is exhibited. If so then the Late Upper Palaeolithic people had a much higher capability in the use of numbers than is generally attributed to them and it follows that there were concomitant terms within their language(s) to explain the system(s) in use.

REFERENCES

- BALDWIN, SIR SPENCER 1927 *The Arunta. Vol. II.* Macmillan. Fig. 120 (*teste* and GILLIN, F. J. Craastone B.A.L.)
- CRANSTONE, B. A. L. 1973 *The Australian Aborigines.* British Museum.
- DEWEY, MICHEL C. 1974 New Hypotheses concerning two engraved bones from La Grotte de Remouchamps, Belgium. *World Archaeology*. 5 (3), 227-245.
- 1975 Nouvelles Recherches à la Grotte du Coléoptère à Bomal-sur-Orthe (Province du Luxembourg). Rapport Provisoire de la Première Campagne de Fouille. *Helinium* 15, 105-133.
- GILLIN, F. J. 1912 *Across Australia. Vol. II.* MacMillan Fig. 178 (*teste* Cranstone).
- GRAY, H. St. GEORGE 1931 See Parry 1931.
- HAWKES, C. J., 1970 Decorated piece of Rib Bone from the Palaeolithic Levels at Gough's Cave, Cheddar, Somerset. *Proc. Univ. Bristol Spelaeol. Soc.* 12 (2), 137-142.
- TRATMAN, E. K. and POWERS, ROSEMARY
- MARSHACK, ALEXANDER 1972 *The Roots of Civilisation.* Weidenfeld and Nicholson, London.
- PARRY, R. F. *et al.* 1929 Excavations at The Caves, Cheddar. *Proc. Som. Arch. and Nat. Hist. Soc.* 74, 102-121.
- 1931 Excavations at Cheddar. *Proc. Som. Arch. and Nat. Hist. Soc.* 76, 46-62.
- RUST, A. 1945 Die-alt und -mittelsteinzeitlichen Funde von Stellmoor. *Neumunster*. 240p. 107pl. (*Teste*. Marshack).
- TRATMAN, E. K. 1975 Problems of "The Cheddar Man", Gough's Cave, Somerset. *Proc. Univ. Bristol Spelaeol. Soc.* 14 (1), 7-24.