Archaeology

New dates for the Acheulean age

J.A.J. Gowlett

THE timescale of the Old Stone Age was completely changed more than 20 years ago by potassium–argon dates[1] that showed that the early archaeological and hominid sites at Olduvai Gorge were more than twice as old as had been generally recognized. These dates, of about 1.8 million years (Myr) before present, left the subsequent million years of Stone-Age prehistory unexplained. The new dating of the Acheulean sites of Olorgesailie in Kenya reported by Bye *et al.* on page 237 of this issue[2], which now jump from about 0.4 to 0.7–0.9 Myr, can be seen as one of the last aftershocks in the process of readjustment.

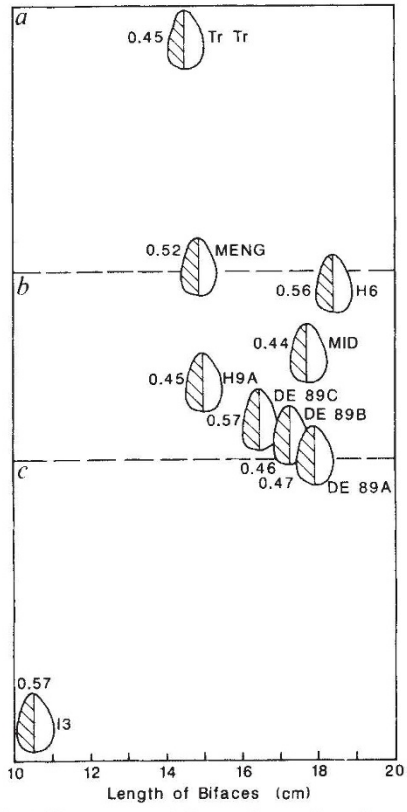
The Olorgesailie complex, discovered by the Leakeys in the 1940s among Pleistocene lake beds in the Rift Valley of Kenya[3] has remained one of the principal exemplars of the Acheulean tradition, largely because of the extensive excavations and detailed studies by the late Glynn Isaac[4]. The Acheulean is the longest Stone-Age tradition, found all over Africa and in much of Europe and Asia. It has many facies, but above all is characterized by large, skilfully shaped stone tools called bifaces or hand axes. Its overall chronological range is reasonably well known[5,6] — from about 1.4 to 0.15 Myr — but within that span there have been few fixed points, and so it has been difficult to examine rates of cultural change.

Although Isaac was quick to explore the implications of the longer timescale[7], Olorgesailie, his first major site, fell squarely in what he cheerfully termed "the muddle in the middle"[8]. Irritating as this lack of a firm date must have been, it undoubtedly helped to shape his contribution to archaeological theory, in particular the exploration of problems of cultural (artefact) variation in circumstances where time relationships were poorly defined. Previous work on other important sites in eastern Africa, particularly Kalambo Falls[9] and Isimila[10], set the scene for this approach. Traditionally, the Old Stone Age had been seen as a period of slow but steady progress, so that an artefact might be dated approximately by its level of sophistication.

The variation seen among contemporary archaeological occurrences within a site complex, as at Isimila, contradicted this view. Isaac concluded that some aspects of assemblage variation at Olorgesailie, in frequency of tool types, for example, were likely to be functional, reflecting different activities. Others, such as variations in hand-axe shape and size, he attributed to a random drift of style. There was sufficient flexibility in a craft tradition to allow cumulative changes, perhaps over several generations, but sufficiently rigorous general limits to keep hand axes to the same pattern over far longer periods.

The new potassium–argon dating described in this issue[2] does not contradict this interpretation. It has the effect of placing most of the East African Acheulean within the Lower Pleistocene, older than 0.7 Myr. Olorgesailie now joins Peninj[5], Olduvai Bed IV[6], Kilombe and Kariandusi[11] in the earlier half of the Acheulean realm. Although stylistic grounds are not dating evidence, much of the Olorgesailie material sufficiently resembles Olduvai Bed IV and Kilombe, that its approximate contemporaneity now demonstrated by Bye *et al.* reinforces the idea that there was a consistency of Acheulean style within certain periods.

Most of the Olorgesailie localities are almost contemporaneous, but Isaac suspected that the artefacts from member 1 (the lowest stratigraphic layer) might be considerably older. This may be supported



Variation among bifaces from the sites at Olorgesailie in Kenya (data from ref. 4). Means of the thickness–breadth ratio are indicated to the left of the symbols. *a*, Upper stratigraphic set, about 10 metres sediment. *b*, Middle set, about 1 metre cut-and-fill sediment. *c*, Lower set, about 10 metres sediment.

by the new evidence that members 1–4 have a different tuff composition from those above. In relation to Site 13 in member 1, Isaac noted that the larger bifacial tools from members 1 and 2 contrast markedly with those from all higher strata. The modal forms of the lower stratigraphic set are smaller and relatively thicker and the trimming scars are characteristically large and deep, and core-like bifaces are common. This could indicate a significant age difference, but not necessarily a straightforward evolutionary progression, as yet earlier bifaces from Olduvai and Peninj exhibit different features. Better knowledge of time relationships in the Acheulean is at last helping to map out the field of variation.

The other principal aspect of the Olorgesailie complex is the preservation of bones on some sites. Meat was an important item of food at some sites, such as DE/89, where many bones and teeth of the giant baboon *Theropithecus* were found with the artefacts. In the 1960s it was common to interpret this association as evidence of skilled hunting[12], but some specialists now attribute it to scavenging and/or the effects of taphonomy — nature's tricks of deposition. The issue is not yet settled.

From his view of the Olorgesailie evidence, Isaac concluded that during this period "the last crucial evolutionary changes that culminated in mankind as we know it, took place". But he confessed that the period lacked the glamour of searching for human origins, adding ruefully that many aspects of the Middle Pleistocene record "strike even enthusiasts as monotonous". Olorgesailie has a central place in the evidence of the period, and is now exciting again, with the new dates taking it out of the Middle Pleistocene and into the late Lower Pleistocene. We are left with a new problem: what important African sites can be placed with certainty in the period 700,000–300,000 years ago? □

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J.A.J. Gowlett is in the Institute of Prehistoric Sciences and Archaeology, University of Liverpool, PO Box 147, Liverpool L69 3BX, UK.