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# THE IMPLICATIONS FOR MIDDLE PALAEOLITHIC CULTURE HISTORY OF RECENT ATTEMPTS AT RADIOMETRIC DATING

by

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## ABSTRACT

A considerable number of attempts have been made to apply various radiometric techniques, in particular U-series and TL, to that part of the later Middle and early Upper Pleistocene beyond the reach of 14-C dating. Many of the ages obtained relate to Middle Palaeolithic industries or the hominids we assume made them. While undoubtedly many of these datings will come to be revised in future as our understanding of the technical problems involved in these dating techniques evolve, nonetheless enough dates now exist for us to re-examine the chronological pattern of cultural change they suggest. An attempt will be made to present an overview of the corpus of dates already published and their implications for the thorny, if ancient, question of the meaning of the patterned technological variation found in Middle Palaeolithic assemblages, particularly from deeply-stratified sites.

## INTRODUCTION

In the late 1960s the Middle Palaeolithic was a vibrant research topic. Excavations had just finished at Combe Grenal, were still continuing at Pech de l'Azé, both in the Dordogne, and the debate over Mousterian variation had just broken over a bemused world (BINFORD and BINFORD, 1969). However, in retrospect it seems that since the early 1970s, specifically since the Sheffield conference published in 1973 as *The Explanation of Culture Change* (BINFORD, 1973; BORDES, 1973), Middle Palaeolithic research has lost its impetus. It is true that excavations have continued at major sites such as the Abri Vaufrey, Dordogne (RIGAUD, 1982), but few really major research papers have been published on the archaeology of the early Upper Pleistocene, papers that really set the archaeological world talking in the way it is *still* discussing the Bordes-Binford debate (BORDES, 1981; DENNEL, 1983a; COLLINS, 1986; GAMBLE, 1986), and the period has become somewhat the Cinderella of Prehistory. Of course archaeology is as prone to fashions as any other subject. In the 1970s attention was caught by finds of early hominids in Africa, that

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research has now slowed down for good reasons not unconnected with political instabilities in eastern and southern Africa. Now the climate is changing again. This is the second major meeting to be organised on the Middle Palaeolithic and Neandertals in 1986, the first was a workshop held at Albuquerque in April. In 1987 Paul Mellars is organising in Cambridge a colloqium on the origins of modern man. Both the apparent desuetude into which the Middle Palaeolithic fell in the later 1970s and the present revival of interest in the period are due to the same factors. As the impact of deep sea oxygen isotope research began to make itself felt a decade ago (SHACKLETON, 1977), it was realised that the geological framework we had worked within for so long was simply inaccurate due to the inadequacies of the fragmentary terrestrial record, but we had no other framework with which to replace it. However, the 1980s are seeing a determined effort to try to fit the scraps of terrestrial record to the wiggles in either the ocean ooze (DUCHADEAU-KERVAZO and KERVAZO, 1983) or long pollen cores (WOILLARD, 1978), or both (WOILLARD and MOOK, 1982), and to provide the new complicated Pleistocene with a reliably dated timescale. The aim here is to draw some preliminary conclusions from how this new timescale affects our ideas on Middle Palaeolithic culture process.

Through a reasonably systematic literature search, those radiometric age determinations which purport to relate to archaeological assemblages which are either definitely considered to be Middle Palaeolithic, or which can be attributed on geological or vegetational grounds to either the penultimate or the last glaciation, or the intervening interglacial have been assembled. However, no claim is made that the information shown graphically in Figure 1 is anywhere near comprehensive, leaving aside any new ages announced at this meeting, but it is sufficient to suggest some major revisions of Middle Palaeolithic culture history may be called for. The dating techniques used include thermoluminescence (TL), Uranium-series and Electron Spin Resonance (ESR). Radiocarbon as is well-known is only relevant to dating the timing of the Middle to Upper Palaeolithic transition (LEROI-GOURHAN, 1984). Plenty of radiocarbon dates exist on Middle Palaeolithic material, the radiocarbon database I update annually now has nearly 150 such dates, but most of them are not worth the paper they were printed on, let alone the time and money they cost to produce. The application of newer techniques to sites already dated by radiocarbon has shown this clearly (SCHWARCZ and SKÖFLEK, 1982).

Perhaps this is the place to suggest that some means of publishing at least the bare essentials of ALL archaeologically relevant dates, with a bibliographic reference, in some journal which most archaeologists at least glance at would be very useful. *Archaeometry* would be a suitable place for such a check list. At the moment far too many dates made using techniques other than radiocarbon sink without trace because they appear in non-archaeological specialist journals.

## MIDDLE PALAEOLITHIC CHRONOLOGY

Despite the considerable problems inherent in the terrestrial record it does appear to be possible to correlate, more or less, the familiar Riss/Würm sequence to both the ocean and the pollen record (LEROI-GOURHAN, 1983; HAESAERTS, 1985). The picture that is emerging is as follows. Riss III at least can be assumed to date to stage 6, about 200-130,000 BP. It is generally accepted now that the last (Riss-Würm or Eem) interglacial is represented by stage 5e, 130-120,000 BP. Würm I, therefore, probably comprises stages 5d-5a, possibly also 4, about 120-70,000 BP, while Würm II comprises stages 4 and the early part of 3, 80-35,000 BP; the Würm II/III interstadial, which appears to coincide with the Middle to Upper Palaeolithic transition in Western Europe, would correlate with pollen stage les Cottés or Hengelo 37,000 BP (LAVILLE, RAYNAL and TEXIER, 1984, 1986). This schema fits the known terrestrial record quite will given our present limitations of knowledge but will no doubt be subject to further revision in the light of future research (DENNELL, 1983b). It suggests that BORDES' (1961) timescale for the Mousterian is

relevant only to the latter half of the Middle Palaeolithic. Actually, it is now apparent that such a correlation has been implicit since before the deep sea data became available. The warm oscillations which probably correlated with stages 5c and 5a show up clearly at Combe Grenal (LAVILLE, 1973), while it has long been recognised that Würm I faunas represented milder more forested conditions than Würm II ones (BORDES, 1972). It seems we must accept RUDDIMAN's view (1977) that it was not until stage 4, Würm II times, that terrestrial glaciation made its presence felt in Europe.

These correlations have considerable culture-historic implications. BORDES originally defined five major distinctive variations on the Mousterian theme (1961). Many attempts to clarify and explain these variants have been made by BORDES himself (1977, 1981) and others (MELLARS, 1969; BINFORD, 1973; ROLLAND, 1977; CALLOW and WEBB, 1980) without great success. However, certain tentative conclusions can be drawn from this work. The most distinctive variants are the Quina and Denticulate Mousterian and the evolved Mousterian of Acheulean Tradition (MTA), while the so-called Typical Mousterian is the lest discrete and may even be a catch-all category for assemblages which cannot be assigned to other variants (CALLOW and WEBB, 1980; BORDES, 1981). Bordes preferred a sociocultural explanation for the difference between the variants. However, MELLARS (1969) attempted to demonstrate the presence of chronological patterning in southwestern France with Charentian (Quina or Ferrassie) assemblages overlain by MTA material in certain Périgordian cave sites which preserve complicated and lengthy sequences. Recent debate in *Nature* has revived the question of contemporaneity or sequentiality in the later Würmian Mousterian (ASHTON and COOK, 1986; MELLARS, 1986a and b). While it is true that considered individually those Périgordian sites which contain both Charentian and MTA assemblages do exhibit the sequence Mellars proposed 20 years ago, his argument has always ignored the geological evidence (LAVILLE, 1973, 1975; LAVILLE, RIGAUD and SACKETT, 1980; LAVILLE, RIGAUD and TEXIER, 1986). It is beyond doubt that caves and rock shelters in this region with long sequences of deposits exhibit discontinuities which are associated with pedogenic phenomena, whether these soils relate to non-glacial conditions, how much erosion has taken place and how long the discontinuities in the different sequences lasted are slightly different questions.

The crux of Mellars' reformulation of his argument (1986a) is that the correlations proposed between these soils at different sites are unproven and irrelevant. A similar argument has been put forward by REYNOLDS (1985). While there are considerable problems with LAVILLE's scheme (1973, 1975), some of the correlations he proposed do seem to be supported by pollen analytical and faunal information at the individual sites. The techniques of deriving pseudoclimatic information from sedimentological data have been demonstrated by other sedimentologists working in both adjacent caves (FARRAND, 1975) and adjoining areas (BUTZER, 1981) to produce patterns they consider analogous to those outlined by Laville. It may well be that his scheme is due for serious revision, but his general correlation of pedogenic phenomena may well survive the test of scepticism. It is after all possible to correlate his synthetic paraclimatic sequence with the oxygen isotope record. The fit between the two data sets is not perfect (LAVILLE, RAYNAL and TEXIER, 1984), has already been revised (LAVILLE, RAYNAL and TEXIER, 1986) and no doubt will be again, but it is sufficiently good to suggest that more credance must be placed in the geological record than Mellars is prepared to admit.

Rather than sterile arguments based on a comparison of one or two specific sites which may well not be representative, a wider view needs to be taken. Sites are now being reported which suggest that the Middle Palaeolithic has its roots in the cultural traditions of the late penultimate glaciation, 200-150,000 BP, and that even then more than one technical variation existed. For northern France TUFFREAU (1979) would include the artefacts from Biache-Saint Vaast (Pas de Calais) within the Typical tradition, but the site is Saalian and possibly 200-150,000 years old, on the basis of a single Uranium date. Other sites in this area are less well dated but there is evidence for a Ferrassie facies at Champroisy

(TRUFFREAU *et al.*, 1981) at about the same time. There is plentiful evidence for the MTA at sites like Epouville and Goderville (Seine Maritime) traditionally assigned to Würm I but probably dating to the beginning of stage 4, 80-70,000 BP (FOSSE, 1982). This is relatively late but considerably earlier than both the traditional and recently produced TL dates (see below) for the 'cave' MTA of the Dordogne.

In the Dordogne both the Quina and MTA traditions appear to have been present by 150,000 BP. At Les Tares (RIGAUD and TEXIER, 1981), an open air site attributed on geological grounds to the late Riss or stage 6, since it was found under a well-developed palaeosol, an industry was recovered having both MTA and Quina affinities, while at the Abri Vaufrey (RIGAUD, 1982) a long cave sequence terminates with a Quina assemblage attributed to early Würm I, possibly stage 5d. These ages are concordant with the age of 100,000 BP announced for Tata (SCHWARCZ and SKÖFLEK, 1982), associated with another Quina industry. Beneath the Quina level at Vaufrey at least 6 archaeological horizons were found comparable to the Typical Mousterian but considered to be of Rissian age. This material is presumably of approximately the same age as the southern Acheulean in the lowest complex at Combe Grenal (BORDES, 1972). Dates for these levels at the Abri Vaufrey fall in the range 200-100,000 BP. Samples were dated by Uranium and TL and, as at so many other sites, the ages produced by the two techniques are not entirely in agreement with each other (RIGAUD, 1982). However, they do indicate the extreme antiquity of the Quina variant at this site. There is also a series of concordant dates for la Chaise-de-Vouthon (Charente) suggesting that the Abri Suard was in use at least during the period 200-100,000 BP, while the Grotte Bourgeois-Delauney was occupied about 150-100,000 BP (SCHWARCZ and DEBENATH, 1979; RAE and IVANOVICH, 1986; RAE, IVANOVICH and SCHWARCZ, 1987). When the site was thought to be of Würmian age the associated industry was considered to be MTA but it has now been reassigned to the terminal Acheulean (DEBENATH, 1974). RENAULT-MISKOVSKY (1986) has recently attempted to correlate the well-known palynological record of the Mediterranean region to the oxygen isotope record. One can infer from her work that in Provence variants of the Typical and possibly the Denticulate Mousterian survived late into stage 3 at sites like Hortus (Hérault) (de LUMLEY, 1972), la Calmette (Gard) and les Ramandils (Aude) (de LUMLEY, 1969), all possibly dating to about 60-40,000 BP.

These data would suggest that not only the TL dates from Combe Grenal (BOWMAN and SIEVEKING, 1983) and Pech IV (BOWMAN *et al.*, 1982) but also the recently reported dates from le Moustier (VALLADAS *et al.*, 1986) are all rather younger than might have been expected, particularly since the breccia in Pech I, thought by BORDES (1972) to correlate to the deposits in Pech II, has been dated to 140-110,000 BP (SCHWARCZ and BLACKWELL, 1983). However, it seems premature to reject any of them categorically on those grounds alone. Considerable difficulties have been noted in obtaining reliable TL dates from burnt flint (BOWMAN, 1982). Those obtained often differ markedly from dates based on other isotopic decay sequences (SCHWARCZ, 1980; DEBENHAM and AITKEN, 1984; DEBENHAM, 1985; AITKEN, HUXTABLE and DEBENHAM, 1986). It may well be that, as with radiocarbon dating, it will take archaeology at least a decade to assess the validity of the ages these new techniques produce.

The only good evidence for MTA in Britain is the so-called bout-coupé bifaces found within a +7 m beach (SHACKLEY, 1977) thought to correlate with the Eemian high sea level. They are likely to be a little older than the raised beach deposits in which they are found, possibly 150,000 BP. A flake assemblage of clear Middle Palaeolithic affinity has recently been excavated from Pontnewydd, Dyfed (GREEN, 1984, 1986), which may date to 220-170,000 BP, but both the material dated and the artefacts have been redeposited. Many age estimations have been made for this site using the Uranium and TL techniques (DEBENHAM and AITKEN, 1984; RAE, DEBENHAM and IVANOVICH, n.d.). Considerable discrepancies were noted between the ages produced by different techniques when applied to samples supposedly of the same age. The problems encountered here

illustrate the difficulties inherent in interpreting radiometric age determinations. At la Cotte de Saint Brelade in Jersey (Isles Normandes) an industry dominated by notches and denticulates but lacking bifaces was found below a palaeosol dated by TL to 250-200,000 BP (CALLOW, 1986). This might be compared with the Tayacian and High Lodge type of assemblages, if only the latter were published and its approximate age known! Higher up the la Cotte sequence in Weichselian deposits is a Typical Mousterian rich in racloirs, which may date back to stage 4.

Elsewhere in Europe few sites have yet been radiometrically dated apart from Tata (Hungary) where U-series dates on travertine deposits overlying the archaeological layer suggest that the artefacts, which are considered to be similar to the Charentian Mousterian, were deposited about 100,000 BP (SCHWARCZ and SKÖFLEK, 1982). Carefully planned programmes of radiometric dating are urgently needed in central and eastern Europe if we are to begin to understand the systematics of culture process rather than merely describing as a series of discrete phenomena the material recovered. The stratigraphy at many of the key sites is still available for study, its re-examination and dating should be given top research priority.

## CONCLUSIONS

On the basis of the dates briefly referred to above it seems reasonable to suggest that the cultural systematics of the early Upper Pleistocene are far more complicated than has been generally appreciated. They seem to indicate that by the end of the penultimate glaciation, approximately stage 6 time, the Middle Palaeolithic was well-developed, particularly in France, and that all the most discretely characteristic variants of the Mousterian were present in fairly developed form. Although, if the Uranium dates from the Grotte du Prince can be accepted (SHEN, 1986), the earliest Middle Palaeolithic was contemporary with the latest Acheulean, which is not at all surprising. Figure 1 would suggest that Mellars' argument for a unidirectional chronological sequence in the Würmian Mousterian is, even if correct, only applicable to a very limited geographical area which may be untypical of Europe as a whole. Both the MTA and Quina variants appear to have been present in France by at least 150,000 years ago. Even if they have not been found in the caves of the Périgord. Many of the French Middle Palaeolithic sites now tentatively dated to oxygen isotope stages 6 and 5 were open air occupations which present a simpler technological picture than do the later Mousterian cave sites, since the tools recovered appear to belong to a single tradition. It may even be that the Mousterian complex as defined by twentieth century archaeologists represents a unique aspect of the Middle Palaeolithic which relates more to the preservation of late assemblages in caves rather than to human behavioural or cultural differences. Moreover, the evidence on which BORDES based his formulation of the Mousterian complex hypothesis (1961, 1981) may also be specific to the mid Würm in Aquitaine, since Würm II sequences from cave sites in the Midi for example (de LUMLEY, 1969) present a simpler picture of multiple layers of a single variant in any given site.

The recently produced radiometric datings are beginning to help us build a new chronological framework for the Middle Palaeolithic, but at the moment they are not assisting in the clarification of culture-historic problems nor in the explanation of 'Mousterian variation'. If anything they have made matters worse since the picture appears to be becoming more complicated, with each Bordian tradition lasting for ever longer periods of time, which makes them even more difficult to explain in cultural or behavioural terms. Mellars is probably correct in his fundamental assumption that there was evolution within the Mousterian. LE TENSORER (1978) has demonstrated convincingly that the Quina variant evolved over time. However, the argument MELLARS has developed (1969) and reiterated (1986a and b) is insufficient to prove his case. Before we can tackle intelligently the problem of Middle Palaeolithic cultural variation we need to accumulate more data. Every effort needs to be made to build up a corpus of credible radiometric ages determined on multiple reliable

samples from unquestioned stratigraphic contexts. When such information has accumulated we may be able to tackle this thorny problem afresh.

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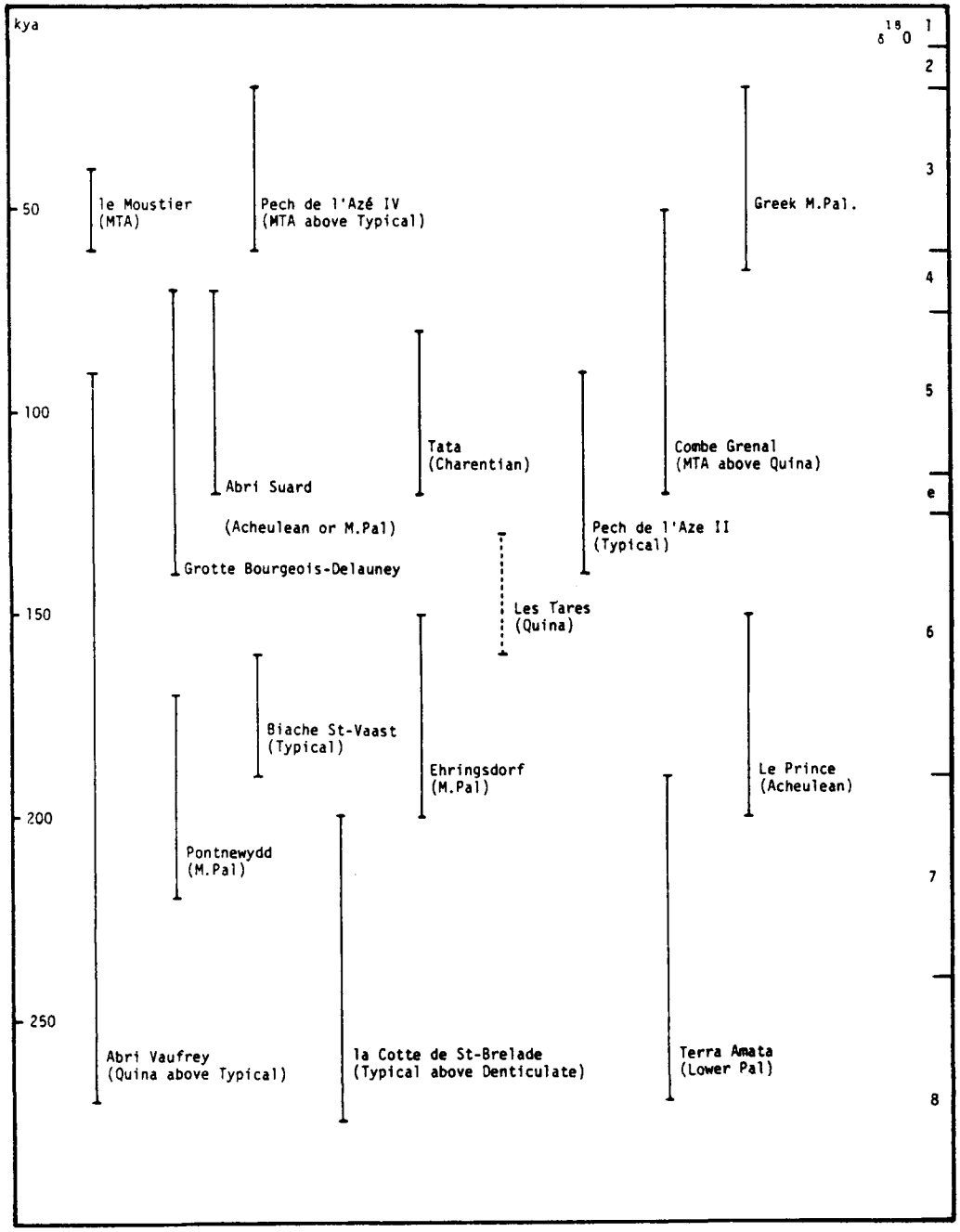


*FIGURE 1*

*Chronological patterning in Middle Palaeolithic industries based on sites dated radiometrically*