

Taphonomy and the Concept of Paleolithic Cultures: The Case of the Tayacian from Fontéchevade

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ABSTRACT

Though many Paleolithic assemblages bear the name, the Tayacian has never been well defined. In fact, its rather non-descript character is a large part of its definition and, while not technically the type site for the Tayacian, the cave site of Fontéchevade with its thick deposits of Tayacian and detailed publication has served as an important reference for this industry. Here we report on our recent re-excavation of the site and study of the existing collections. Based on this work it is clear that the Tayacian of Fontéchevade is largely a result of taphonomic factors of mainly natural origin that brought together unworked, fractured flints from the cave walls, rolled worked and unworked flints from the overlying plateau, gravels from the overlying plateau that were interpreted as hammerstones, and infrequent occurrences of stone artifacts that may in fact have been manufactured in place or at least deposited there by hominins. As a result we suggest that the term Tayacian should no longer be used to describe lithic assemblages and that archaeologists need to continue to be careful linking archaeological assemblages to shared patterns of behavior that might be interpreted as Paleolithic cultures.

INTRODUCTION

The Tayacian was first recognized early in the 20th century by the French archaeologist Denis Peyrony at the site of La Micoque (Peyrony 1938), located in the Department of the Dordogne in SW France (Figure 1). Not long afterwards, later excavations at another site 80 km to the northwest, in the Charente, yielded an even larger assemblage of this type, which was more fully documented by the excavator (Henri-Martin 1957). It was for this reason that this latter site, Fontéchevade, ultimately become the reference site for the Tayacian. Based on recent excavations at this site by the present authors, however, there are multiple lines of evidence that, taken together, strongly suggest that the assemblage present in this cave is largely of natural, rather than anthropogenic, origin. The presentation of these results, in the context of the history of the Tayacian and the cave of Fontéchevade itself, represents one of the two main foci of this paper.

The second focus is on the larger implications of those results. First, there are implications for the status of the Tayacian as an actual industrial variant with behavioral significance. On the one hand, it has always been the case

that the Tayacian appeared so heterogeneous as to throw doubt on its reality. In addition, many Tayacian assemblages seemingly owed at least part of their appearance to naturally occurring factors rather than to human intent. Our work at Fontéchevade, arguably the most important Tayacian site, supports this conclusion. This would mean that the term Tayacian should no longer be used as an industrial variant.

On an even higher level, the very fact that the Tayacian had, for such a long time, been considered as a Paleolithic culture, complete with an association of a distinct hominin type—the highly debated “pre-Sapiens” remains found there (Vallois 1958)—raises the larger question of how such a concept can and should be applied to early Paleolithic assemblage groups.

Paleolithic archaeologists almost never define what they mean by the word “culture,” (but see Guilmet 1977; Gowlett 1984; 1996; Holloway 1969; 1981; Isaac 1976; also see Marks et al. 2001 for a partial review). This makes it very difficult to document patterns in how the term has been used. However, archaeologists seem to mean one of three different things when they use the word. The real dif-



Figure 1. Map showing location of Fontéchevade and other nearby sites mentioned in the text.

ferences among them are not how cultures are identified in the archaeological record. In empirical terms, “cultures” (like “industries”) are generally considered to be sets of assemblages that are similar to one another and that differ from others, especially (but by no means exclusively) from ones that are chronologically or geographically separated from them.

Where scholars diverge is in their implicit explanations for differences among archaeological “cultures”. One set of scholars uses the term—or, more often, the word “industry”—to mean a set of similar assemblages, with no explanation (ethnicity, function, etc.) implied. In the second definition, a culture seems to be equated with a set of flintknapping traditions that are assumed to be common to some population. These may be typological, technological, or both. They may also be associated with bone or antler working traditions, or other traditions. These are learned from other members of one’s social group by observation or perhaps by deliberate teaching. Such traditions are found, in rudimentary form, among non-human primates

(Hohman and Fruth 2003; Van Schaik et al. 2003; Whiten et al. 1999; see also Nishida et al. 2004), although they are not known to persist for any significant length of time. Finally, for some archaeologists, cultures are considered to rest on shared standards for the manufacture of stone tools, rather than on simply learned procedures. Culture means something more than anything found in non-human primates. It implies the existence of shared symbolic, linguistic, and other conventions (after all, a standard is a shared convention).

In practical terms, the empirical phenomena that are called cultures are the same under any of the three definitions. Moreover, since function, raw material, learned traditions, and shared standards can all affect the appearance of an archaeological assemblage, it becomes very difficult to infer a cause from the mere existence of internal similarity among assemblages (Chase 1999, 2001, 2006). The word “culture” therefore needs to be used much more cautiously in Paleolithic archaeology than has generally been the case.

It is equally clear that taphonomic factors—purely natural processes—may produce lithic assemblages that resemble archaeological “industries” or “cultures” left behind by culture-bearing people. The most famous example of this is the Osteodontokeratic, which was proposed by Dart (1957) as an early Australopithecine precursor to later lithic industries.

The term Osteodontokeratic refers to the proposed use of bone, teeth, and horns as both tools and weapons, and it was based on the nature of certain post-mortem modifications to the bones and on the fact that certain skeletal elements were disproportionately represented in some early sites. The reality of the Osteodontokeratic was debated for some time, though eventually the pioneering work of Brain (1969, 1981) conclusively showed that the over-representation of such elements was an expected result of natural factors that favored the preservation of certain elements over others. It is now well known that hyena and other carnivores typically exhibit most of the features that comprised the Osteodontokeratic assemblages, as well as other kinds of objects sometimes interpreted as being of anthropogenic origin (Shipman and Phillips-Conroy 1977, Villa and Bartram 1996; Villa and Soressi 2000).

The example of the Osteodontokeratic is an important one also because it represents one of the first applications of the field known as taphonomy to studies of Paleolithic remains. Ironically, taphonomy shares some of the same intellectual roots as Paleolithic archaeology, namely paleontology (see Sackett 1981; Dibble and Rolland 1992), for the term was originally coined to refer to the transition of paleontological material from the biosphere to the lithosphere (Efremov 1940). Strictly speaking, anything that happens between the death of an animal and the arrival of its bones in the laboratory is the subject of taphonomy (Lyman 1994:3-5, 12-40). In archaeological context, the term is applied generally to distortions of the record due to natural agencies (Bonnichsen 1988, 1989; Brain 1981; Binford 1985; Nielson 1991; Dibble 1995a; Dibble et al 1997; Kluskens 1995; Nash and Petraglia 1987; Schick 1986; Schiffer 1987; and many others), and it is generally synonymous with the term natural formation processes (Schiffer 1972).

There are many examples in the literature of how an understanding of taphonomy has impacted our reconstruction of hominin behavior, and many of them, if not most, show that what was originally interpreted as reflecting hominin behavior is, in fact, the result of completely natural processes. Such explanations are applied to individual artifacts (e.g., Chase and Nowell 1998; D’Errico and Villa 1997), specific assemblages (Dibble et al. 1997), and, as in the case of the Osteodontokeratic, to entire “cultures.”

It is our thesis that such natural processes offer a much more parsimonious explanation for the Tayacian of Fontéchevade than does hominin behavior. The rest of this paper will present some background to the Tayacian, followed by a description of the material from Fontéchevade. It will then be shown how this material was deposited at the site—perhaps occasionally by hominins but primarily by washing into the cave through a natural chimney. The fur-

ther implications of these results—for Fontéchevade itself, for the Tayacian in general, and for our ability to recognize anthropologically relevant cultures in the Paleolithic—will be discussed at the end of the paper.

BACKGROUND TO THE TAYACIAN

As recounted by Bordes (1984:57) the naming of the Tayacian came about without a lot of fanfare. After the excavations at La Micoque by Hauser from 1914-1918, Peyrony went back to the site in 1929 and discovered a series of levels that underlay the so-called Micoquian horizons (Peyrony 1938). In these layers were some assemblages that generally lacked the kind of refined bifaces that had come from Hauser’s excavations and consisted instead of large flakes and rough flake tools. Being a bit undecided as to what to call this industry, Peyrony took the advice of the Abbé Breuil, who had happened to pass by the site for a visit on his way to the nearby village of Les Eyzies-de-Tayac, and who suggested naming it for that village.

At the time, the problem faced by Peyrony was that it was difficult to deal with a non-handaxe industry that preceded the Mousterian. In the previous century, de Mortillet (1869, 1883) established a unilineal scheme for the Paleolithic based on the kinds of artifacts represented rather than on paleontological grounds alone (Lartet 1861; Lartet and Christy 1865-1875). De Mortillet’s sequence began with the Chellean and Acheulian, which contained bifaces; followed by the “Epoch of Le Moustier,” or the Mousterian, which was a more flake-based industry; and subsequently the Solutrean and Magdalenian, which had more sophisticated lithic assemblages and bone tools. Later, Comont (1910, 1913) continued the refinement of the unilineal ordering of the Paleolithic based on his work in the Somme Valley in northern France.

It was Breuil (1932; Breuil and Lantier 1959) who proposed the existence of two major contemporaneous Lower Paleolithic phyla, the Clactonian (composed on flake tools made on unprepared blanks with large, unfaceted platforms) and the Acheulian (which contained significant percentages of bifaces of various types). By isolating two independent “phyla” in the Lower Paleolithic, it was thus possible to have non-biface industries preceding the Mousterian, and for him the Tayacian was then just one variant of a number of “Pre-Mousterian” industries. In the extreme paleontological perspective that was prevalent in archaeology at the time, the Tayacian was thus seen as a direct descendent of the Clactonian, and it chronologically preceded the Micoquian. The linkage to the Clactonian was based on the fact that the Tayacian had similar sorts of large, wide flakes, but there were also more evolved aspects of the Tayacian in that it exhibited a higher degree of platform faceting and less pronounced bulbs of percussion. In turn, the Tayacian was seen to have eventually evolved into the Levalloisian, which still later merged with the Acheulian to produce the “Cave Mousterian.”

Thus, for Breuil the Tayacian was a flake industry without handaxes, with some degree of platform preparation, but lacking the degree of core preparation that would en-

able it to be called Levallois. It dated to a time before the final Acheulean and exhibited a style of flaking reminiscent of the Clactonian (Breuil 1932).

In subsequent years, the Tayacian seemed to appear everywhere. In the Levant, Garrod (Garrod and Bate 1937: 89-90) noted the presence of the Tayacian in the lowest level of Tabun; Neuville (Neuville et al 1951; see also Perrot 1968) described it in the sequence at Oumm Qatafa; and, Solecki (1968) described it at the site of Yabrud. In North Africa, it was found at the sites of Bahsas (Howell 1959) and Sidi Abderamman (Neuville 1951, Antoine 1951, Biberson 1961). In Central Europe, the Tayacian was found in the Kulna Cave in the Moravia province of the Czech Republic (Valoch 1968). In France a number of assemblages were attributed to this industry, including the lower levels of Combe-Capelle Bas (Fitte 1948), Baume-Bonne (de Lumley 1960), and Mas des Caves (Le Grand 1994), to name a few. And though most published references to Tayacian are historical, the term is still used today (e.g., Abbazzi et al. 2000).

As noted by many authors of the 1940s and 1950s, there was an early controversy as to the homogeneity of the Tayacian. Fitte (1948), for example, suggested that there was one facies that was focused on the production of large flakes (seen in the basal levels of Combe-Capelle Bas—cf. Dibble and Lenoir 1995), and another facies of small, thick, and irregular flakes (apparent at La Micoque and La Ferrassie, for example). Others (such as Bourgon 1957) started referring more to the typology of early industries in assigning them to the Tayacian, emphasizing the production of notches, denticulates, so-called Tayac points (convergent denticulates), and pieces with abrupt and alternating retouch. After some time, as more and more assemblages were found and named Tayacian, the heterogeneity of this industry became such that it was effectively in “a state of classificatory limbo” (Rolland 1986:124; but see also Peyrony 1950; Bordes and Bourgon 1951). The situation grew even worse as several new names appeared in the literature that more or less described the same phenomenon: Howell (1959) suggested the name “Tabunian” for the examples from North Africa and the Levant; Solecki (1968) named the Tayacian-like assemblages from Yabrud the Shamshi industry. The material from Combe-Capelle Bas, now dated to between 50-60 kyr (Valladas et al. 2003), is likewise now seen as a lightly-reduced variant of what is known, on technological grounds, as the Quina Mousterian.

Not everyone was convinced, however, that the Tayacian reflected only human modification. Bordes himself (1953, 1984; Bordes and Bourgon 1951) believed that at least some of the typological nature of the industry, especially the abrupt and alternating retouch, was a result of post-depositional processes that damaged the material. Indeed, at many of the sites mentioned above, layers that exhibited such assemblages were also shown to be geologically disturbed. Bordes (Bordes and Bourgon 1951:17, 1953) also showed by experimental trampling (cf. McBrearty et al. 1998) that it was very easy to produce such “tools” naturally. In fact, one of the categories of “tools” organized by Germaine Henri-Martin and stored presently in the Musée

National des Antiquités at Saint-Germain-en-Laye, was labeled by Bordes as “podoliths.”

THE TAYACIAN OF FONTÉCHEVADE

As mentioned earlier, the reference site for the Tayacian is really Fontéchevade (Figure 2), and there are at least two reasons why it earned this status. First, the Tayacian is particularly well represented there in a thick deposit. Second, unlike those of La Micoque, the Fontéchevade excavations were well published in two volumes soon after the excavations terminated (Henri-Martin 1957; Vallois 1958), which enabled other scholars to compare their materials to it.

Although Fontéchevade had been excavated sporadically since the late nineteenth century, it is best known from the excavations of Germaine Henri-Martin (1957) from 1937 to 1954. Her major finds were two fragmentary remains of hominin crania. Because of the modern aspect of one of them (Fontéchevade I), and given that they were originally thought to have considerably preceded later Neandertal populations, the Fontéchevade specimens became cornerstones for a theory prevalent in the mid-twentieth century that there was a side branch of modern “Pre-Sapiens” that were distinct from the Neanderthals and which led directly



Figure 2. The entrance of Fontéchevade.

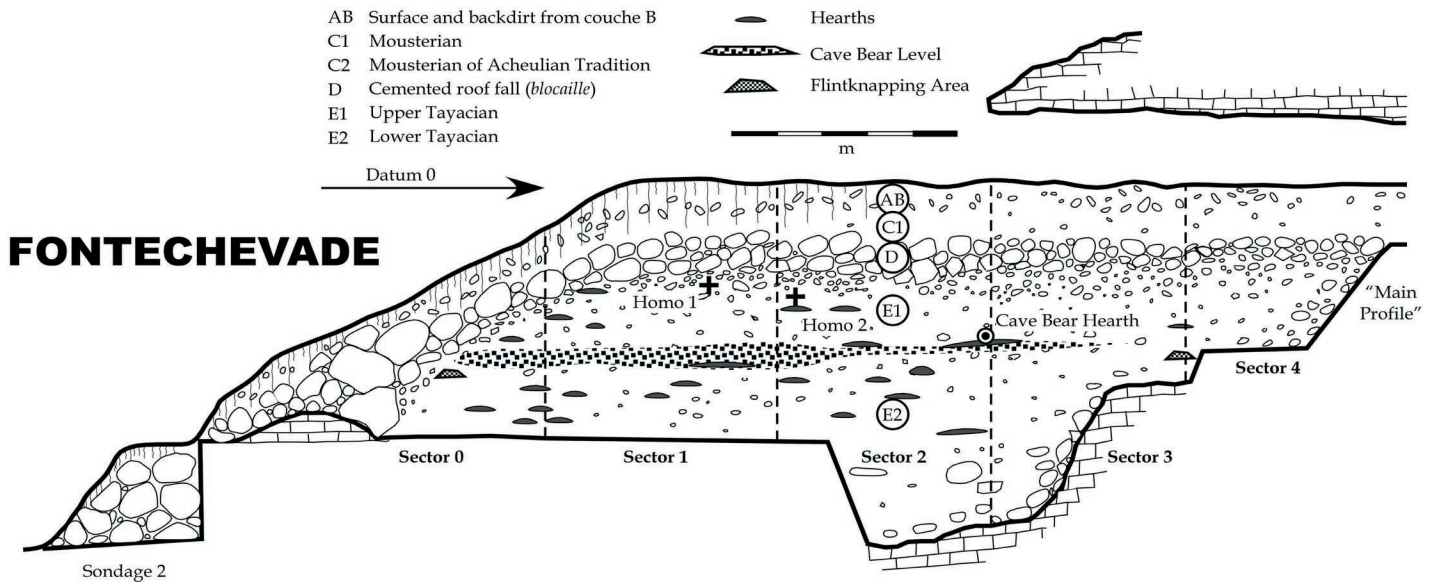


Figure 3. Sagittal section of Fontéchevade, indicating levels defined by Henri-Martin (redrawn from Henri-Martin, 1957).

to modern *Homo sapiens* (see Vallois 1958; Trinkaus 1973; Mann and Trinkaus 1973; Brace 1964; Sergi 1962).

The Tayacian came from the six-meter-thick stratigraphic unit recognized by Henri-Martin as Level E and subdivided into arbitrary horizontal spits labeled as E0, E1', E1'', E2', E2'', and E2''' (Figure 3). Overlying this and separated from it by a mass of largely brecciated roof fall, were levels containing very sparse examples of Mousterian (Levels C1 and C2) followed by some Chatelperronian (context unknown) and Aurignacian (Level B); Bronze Age burials were found at the back of the cave (Henri-Martin 1957). Altogether, Henri-Martin excavated most of the area from about ten meters in from the present dripline to the outermost extent of the sedimentary talus.

In the front, outside of the dripline, she left a small amount of deposit referred to as the Witness Bed (*Témoin*); inside the cave her excavations stopped at a frontal section that we refer to as the Main Profile (Figure 4). She also made a rather large test pit in the back of the cave.

There are three classes of raw materials present in the Fontéchevade lithic assemblages: flint (occurring in very limited quantities), quartzite (mostly in the form of cobbles, though some have flakes removed from them), and a very poor quality local chert that erodes directly from the bedrock of the cave itself. The quartzite cobbles and the flint came from elsewhere, though there are large numbers of quartzite cobbles on the overlying plateau.

The interpretation put forward by Henri-Martin was that hominins associated with the Tayacian entered the cave with some flint that they transported from elsewhere, along with quartzite cobbles. They came to the site with the express intention of using the cobbles as hammerstones to exploit the chert eroding out of the cave itself. Thus, in effect, for her, Fontéchevade was a site of raw material exploitation, with most of the archaeological materials being manufactured on the site itself. Henri-Martin (1957:231-44) also believed that people lived in the cave year around and

Fontéchevade 1994-1998

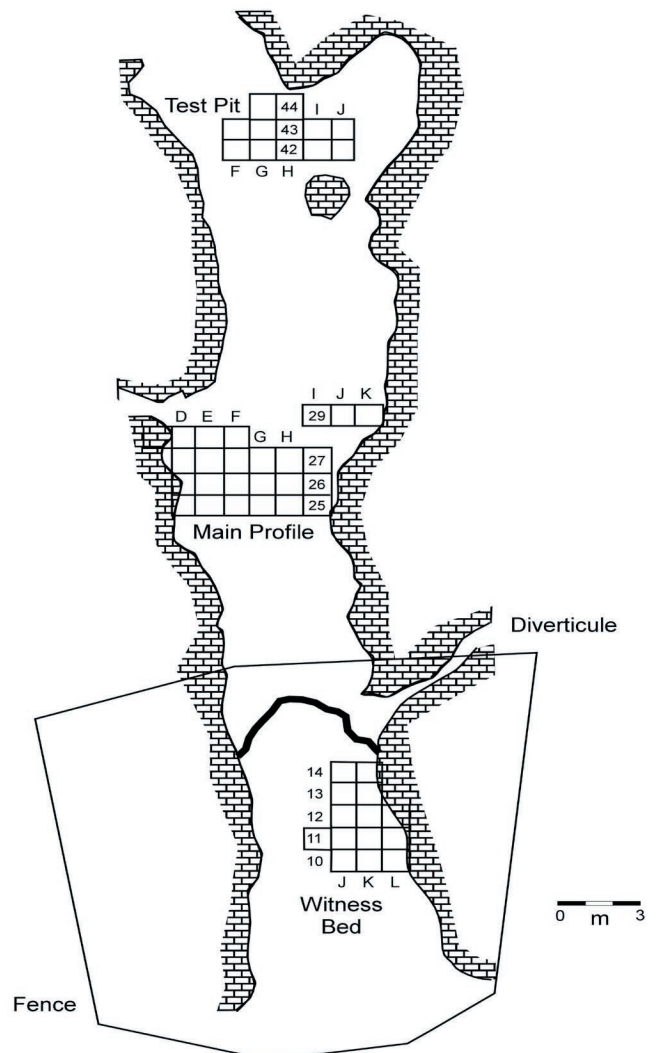


Figure 4. Plan view of Fontéchevade showing location of excavation units defined for recent excavation.

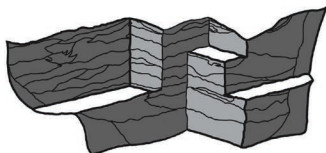
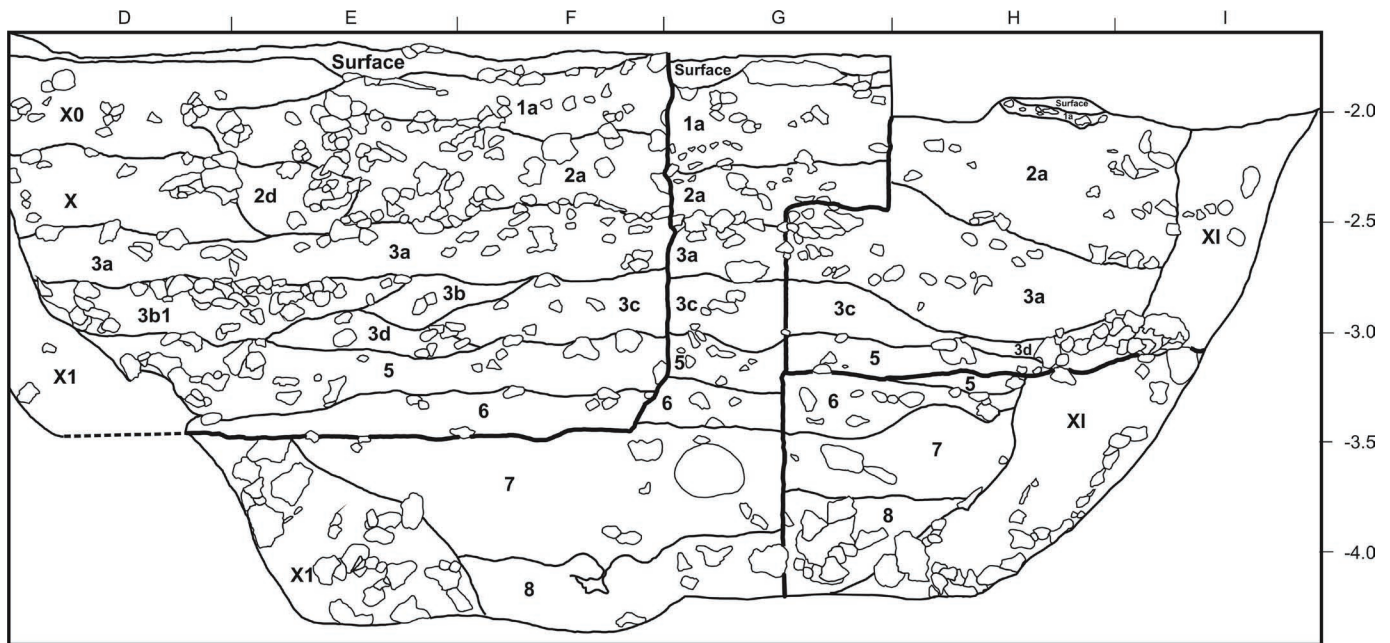


Figure 5. View of Main Profile (looking into the cave, Grid North), following recent excavations. The section was left stepped to prevent collapse.

carried out certain domestic chores there based on the appearance of what she interpreted as hearths.

From 1994 to 1998, the authors of this paper re-excavated the site. This project included a complete re-analysis of Henri-Martin's collection at the Musée National des Antiquités. The new excavations sampled the entire remain-

ing stratigraphic sequence on the Main Profile, Witness Bed, and Test Pit. The discussion that follows will focus on the Main Profile where the Tayacian layers are best represented (see Figures 4 - 6). Our own Levels 2A, 3A, 3C-3D, and 5 correspond to at least part of the ensemble of Henri-Martin's layer E, although there is no one-to-one correspon-



Fontéchevade 1998
Grid North Section



Figure 6. Drawing of Main Profile indicating levels defined in recent excavation.

dence between her subdivisions and ours. The independent stratigraphy of the Test Pit is designated by letters (A1, B1, etc), and that of the Witness Bed by numbers preceded by the letter T (for *Témoïn*, e.g. T1, T2, etc).

TAPHONOMY AND THE TAYACIAN OF FONTÉCHEVADE

One of the main reasons for re-excavating Fontéchevade was to assess the site formation processes that may have operated in this kind of context. When the site was originally excavated, the association of bones and stone tools in a cave was uncritically accepted as evidence of human agency in their accumulation. Given the issues outlined above, the site seemed particularly appropriate for a modern re-evaluation. Though the results of the excavations are many, the three principal lines of evidence for assessing the site formation come from the geology, the study of the stone tools, and a zooarchaeological study of the fauna.

GEOLOGY

The sedimentary filling of Fontéchevade resulted from a combination of materials that were subsequently modified to a greater or lesser extent by various processes. Blocks of the dolomite sandstone bedrock were detached from the cave walls and ceiling, probably largely by solution processes, which also released numerous chert nodules that accumulated in the fill. Much, if not all, of the bedrock in the fill has been subsequently dissolved from the cave sediments. Simultaneously, silty loam with greater or lesser amounts of clay, and exotic rock types, largely quartz cobbles, pebbles, and granules, entered the cave and now comprises the bulk of the sediment. The basal deposit—the “*argiles de fond*” of Henri-Martin—found at the bottom of the Main Profile (Level 8 in the terminology of the new excavation) appear to be residual karstic clays deposited before, perhaps long before, the cave was utilized by humans. It is pure clay with no rocks and no exotics, though it did contain natural casts of reeds.

As mentioned above, relating the existing sediments to Henri-Martin’s stratigraphy is somewhat problematic. The sediments in the area of the Main Profile correspond to her Tayacian Level E in part, but the uppermost Tayacian (E0 and E1’) appears to be missing, judging from her observation that the top of the Tayacian was just below the brecciated roof fall of Level D that was heavily charged with carbonate. Our analysis finds an increase in CaCO₃ at the top of the present Main Profile, but only a moderate increase, and it could be that the character of these arbitrary levels changes toward the rear of the cave. Whether or not these two levels are present, it is clear that Henri-Martin’s Levels A, B, C, and D are completely missing in the area of the Main Profile.

Correlations to her stratigraphy in the Test Pit at the rear of the cave are even more problematic. The sediments at the eastern and western extremes of the Test Pit are quite different. Our Levels A1, A2, and B have no equivalents in the upper part of Henri-Martin’s Test Pit, and the stalagmitic lenses and crusty silts of Henri-Martin’s AB, C1, and

C2 are absent in the east at the same depths. Our Level B fills a clear erosional channel cut in Level C, marking an unconformity. Our Level C is the likely equivalent of Henri-Martin’s Level D, with highly decayed, manganese-stained dolomitic sandstone blocks and chert nodules. If these correlations are correct, then all beds in the eastern, newer part of the Test Pit should be Mousterian or younger. The bottom of Level T2 of the Witness Bed is conceivably equivalent to our Test Pit Level C and consists of a dark reddish brown clay loam containing decaying dolomitic sandstone pebbles and abundant manganese granules; heavily manganese stained chert nodules occur near the top of this level.

There are several gaps (unconformities) in the sediment infilling. As mentioned above, Level B in the Test Pit fills an erosional unconformity. Henri-Martin (1957:43) also noted an erosional channel in part of her Mousterian strata, which may be the equivalent of the channel now exposed in the Test Pit. There may be another minor unconformity above Level B where sloping Levels A1 and A2 appear to truncate the top of Level B.

Two unconformities were found in the Main Profile. The most obvious one occurs between Levels 7 and 8. The heavy, bright colored clay of Level 8 has developed a blocky structure presumably as it lay exposed on the cave floor for an unknown duration, prior to being covered by Tayacian-bearing strata. Higher in the section the sedimentary character of the lower part of Level 3 suggests another hiatus in sediment accumulation. These sediments are oxidized to a brighter yellowish color, they are sandier than above or below, and they are slightly cemented, all of which suggests a period of incipient pedogenesis at this level.

It is possible that an unconformity occurs at the base of Level T2 in the Witness Bed, between the odd, sandy stratum at the bottom of T2 and the clay-rich T3, which is perhaps an “*argile de fond*” (*sensu* Henri-Martin). This gap would have been produced by the slumping that occurred in the outer portion of the cave, as visualized by Henri-Martin.

It is not possible to make a quantitative estimate of the duration of any of these unconformities. In relative terms, the time gap between Levels B and C in the Test Pit must be rather long, given the highly weathered nature of Level C and the rather fresh-looking Level B. Also, the gap between Levels 7 and 8 in the lower part of the Main Profile may be of considerable length, if the “*argiles de fond*” are indeed karstic deposits formed before the cave was exposed to the open air. In any case, the evidence of weathering associated with each of the unconformities (except in the Witness Bed) means that they are not insignificant events.

Based on this geological evidence, therefore, it is quite likely that the main source of the sediments associated with the Tayacian entered the cave through an opening, or chimney, which connected the cave with the overlying plateau (Figure 7). This is strongly suggested especially by the high presence of quartz cobbles, pebbles, and granules, which are clearly of exotic origin simply because the bedrock itself contains none of these materials. Heavy-mineral studies by Duplaix (in Henri-Martin 1957) reinforce this conclusion.

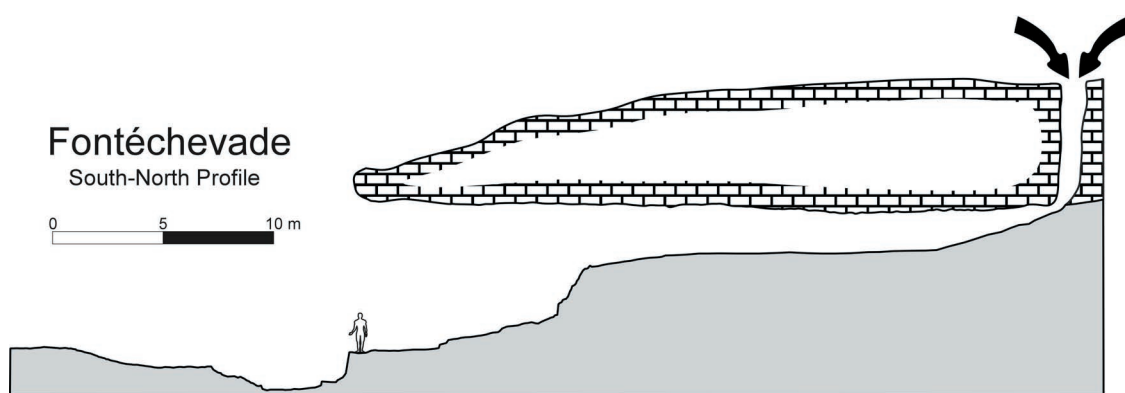


Figure 7. Schematic sagittal-section of Fontéchevade (after GHM excavations) indicating the location of the natural chimney in the back of the cave.

One such chimney has been located in the back of the presently accessible part of the cave, although others may have been open in the past. In general the limestone in this area is characterized by very complex karstic systems. The nearby site of La Chaise attests to this with its multiple chambers and passages and the same is true for other uninhabited caves in the immediate vicinity.

LITHIC STUDIES

A comparison of the lithic material of Henri-Martin's collection and our own shows some differences in the overall sizes of worked artifacts, with material from our own excavation being a little smaller in every dimension (Figure 8). This suggests that she tended to save the larger pieces, which is not surprising given the methods employed at that time. Other than that, few significant differences exist, which suggests that in other respects she was a careful excavator who tended to save most classes of material, including the major classes of flakes, retouched tools, and cores (Figure 9). However, her collection also includes a large number of pieces that were totally unworked. In fact, out of a total of almost 8,000 pieces in her collection, just over 5,000, or

almost 65%, were unworked pieces, primarily of chert, that she mistakenly believed to be real artifacts. Nonetheless, many of these unworked pieces were classified by her into various non-standard types such as "parallelepipeds," "biseau-ciseau," and others (Henri-Martin 1957).

When examining the two collections on the basis of the more commonly recognized Bordian types (Bordes 1961; Debénath and Dibble 1994), two things are apparent (Figure 10). First, the Tayacian from Fontéchevade is dominated by types 46–49, which collectively are flakes with irregular retouch on both the interior and exterior surfaces. These "types" have been for some time interpreted as edge damaged and not as deliberately retouched artifacts, with the damage being the result either of use, or more often, damage from depositional processes (see Debénath and Dibble 1994). Among the retouched pieces, the dominant types are notches and denticulates; scrapers are not well represented and there are no bifaces. As is apparent from this figure, the two collections are virtually identical. This is also the case when they are compared using technological criteria such as platform faceting, exterior scar morphology, etc. The attribution of this industry to the Tayacian is relatively

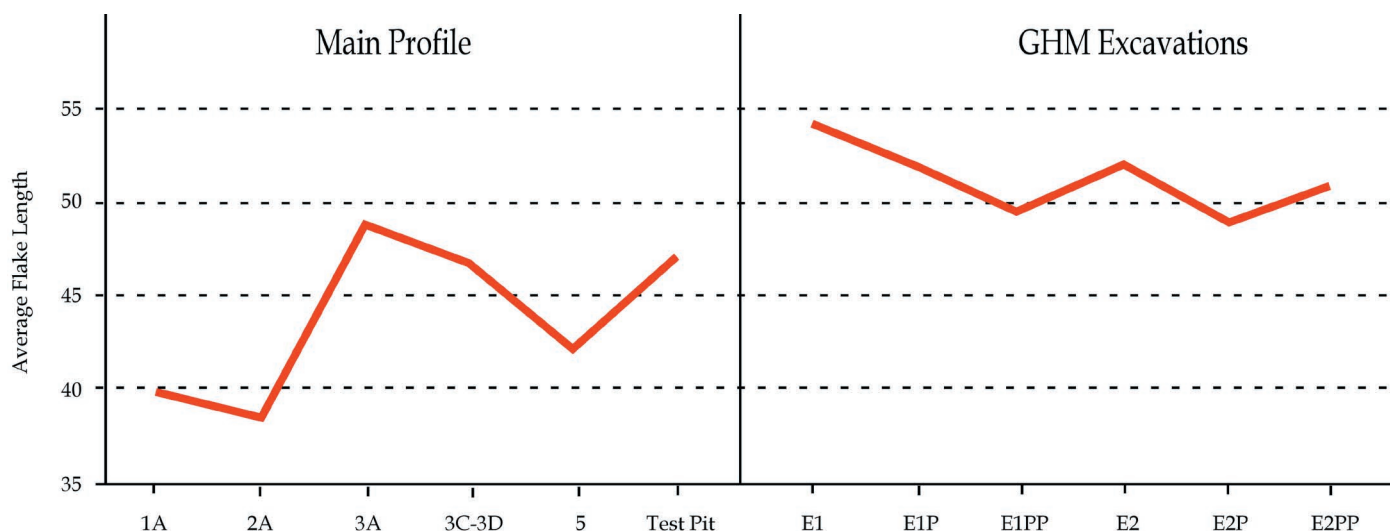


Figure 8. Average flake lengths from both recent excavations and those of Henri-Martin. Both sets of stratigraphic units go from top (left) to bottom (right). The pieces from the previous excavations are larger in every dimension, indicating some bias during her excavations.

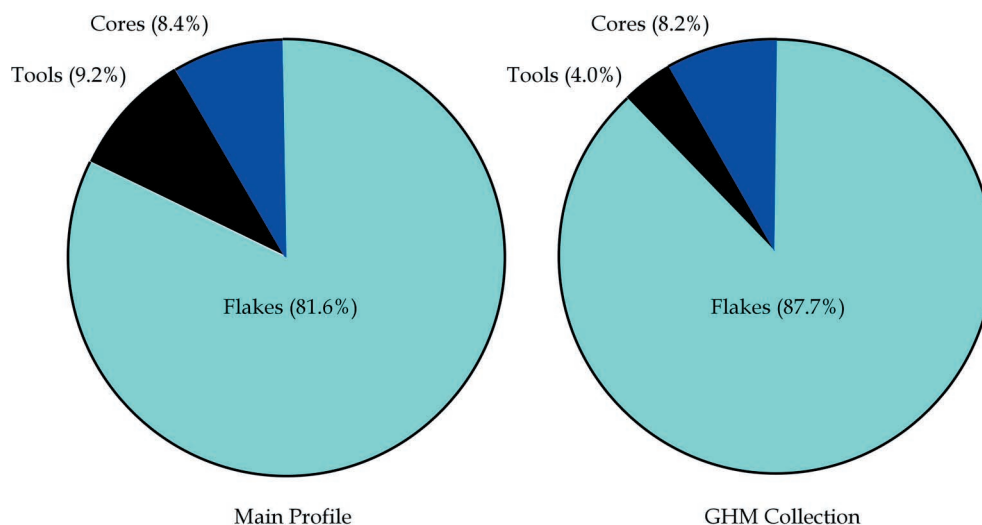


Figure 9. Basic breakdown of lithic classes from both recent excavations (Main Profile, $N=761$) and those of Henri-Martin ($N=2523$), based on analysis of her collection.

straight forward, given that it is a flake-dominated industry, with little Levallois, no bifaces and no other distinguishing characteristics. Altogether, the overall similarity of the two collections is clear and it argues against an initial concern of ours that she had completely excavated the artifact-bearing deposits and stopped excavating only when the archaeological deposits ended. Rejection of this possibility is important because it means that the results of our analysis of the stone tools can be extended to the entire site.

It is important to emphasize, however, that deliberately retouched pieces are extremely rare in either collection. Henri-Martin's collection contains only 111 of them. We estimate that she excavated 750 cubic meters of sediment, which means she found one retouched artifact per 6–7 cubic meters. Our own excavations yielded only 55 retouched pieces in just over five cubic meters or roughly ten pieces per cubic meter. The fact that our artifact densities are greater than hers is not surprising, however, given the differences in excavation methodology. Nonetheless, the overall density of retouched artifacts is extremely low in both collections. Given that the sedimentological evidence

suggests a primarily geological rather than anthropogenic source for the sediments, and given that the source of the sediments was external to the cave, the lithics were studied to test the hypothesis that they too may have entered the cave with the sediments. If so, then to what extent could site formation processes explain the character of the Tayacian industry? Our focus is on three aspects of the material related to site formation: damage, size distributions, and orientations.

Damage

Not all geological processes that can displace artifacts always result in damage to the pieces, however, the presence of edge damage can be indicative of movement (Gifford-Gonzalez et al. 1985; Schiffer 1987). Because the edges of lithics are so thin and sharp, this damage most often will be especially apparent there. Figure 11 illustrates a few pieces from our own excavation at Fontéchevade, while Figure 12 presents a graphical summary of the edge damaged observed at three sites (analyzed by the authors following a consistent methodology), and separating our

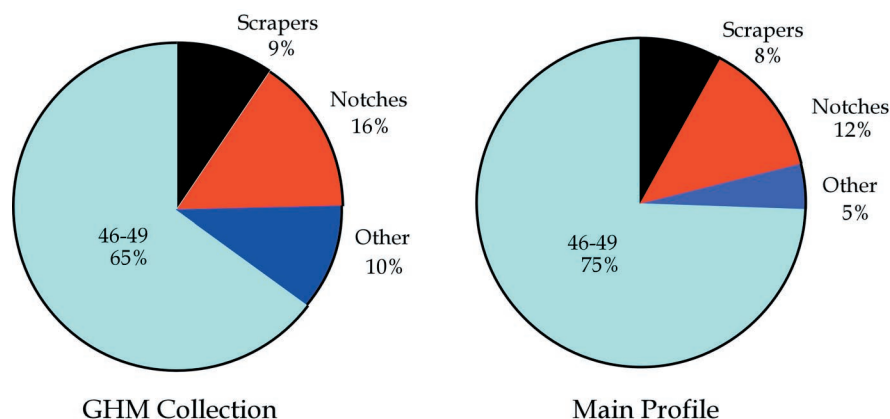


Figure 10. Basic breakdown and comparison of major tool classes (including types 46–49, which are essentially edge-damaged pieces) from the recent excavations (Main Profile, $N=418$) and those of Henri-Martin ($N=369$).

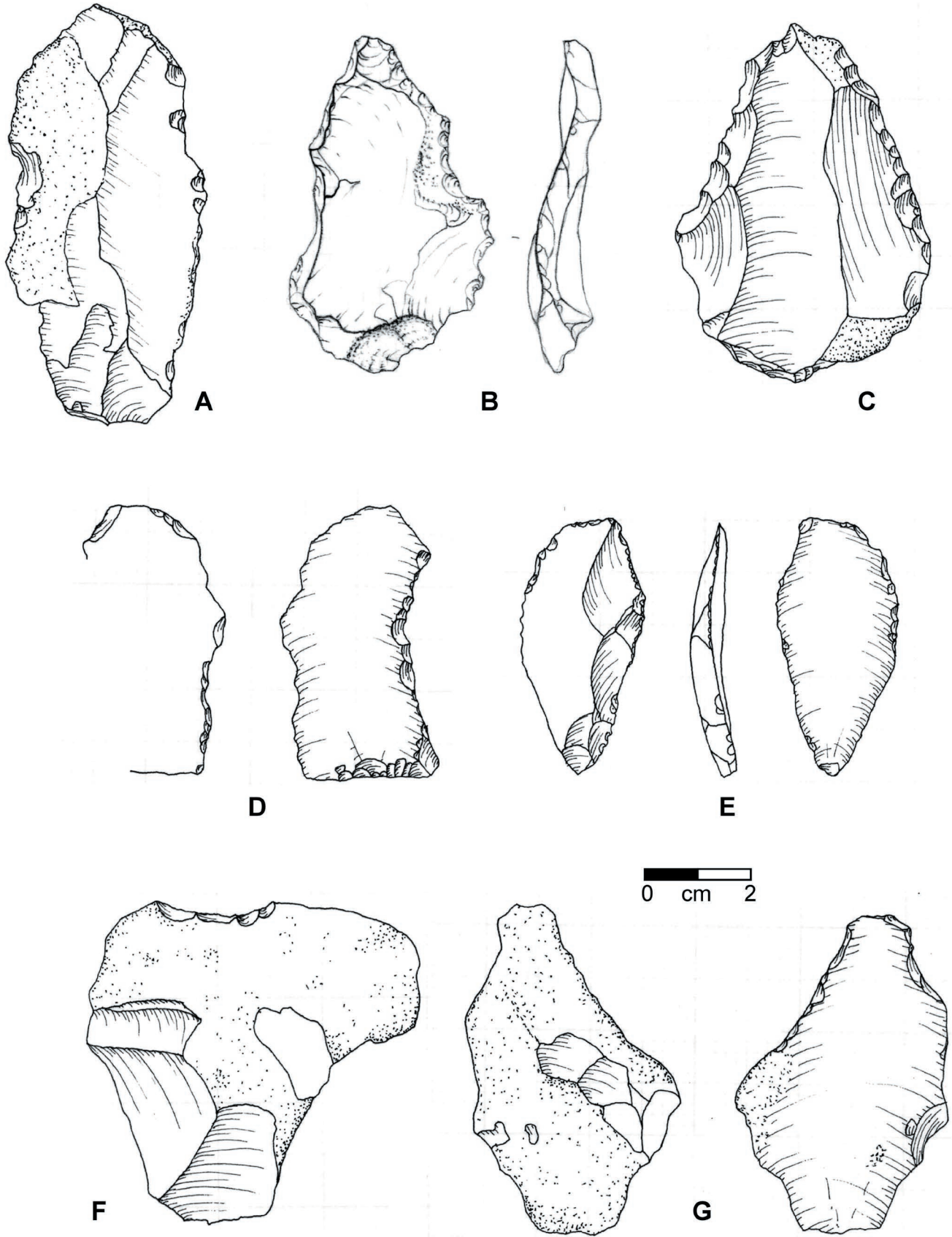


Figure 11. Selected artifacts from the Main Profile of the new excavation. Note the degree of damage, which is highly prevalent in the industries. A, B, E: Level 3A; C: Level 3D; D, F, G: Level 5.

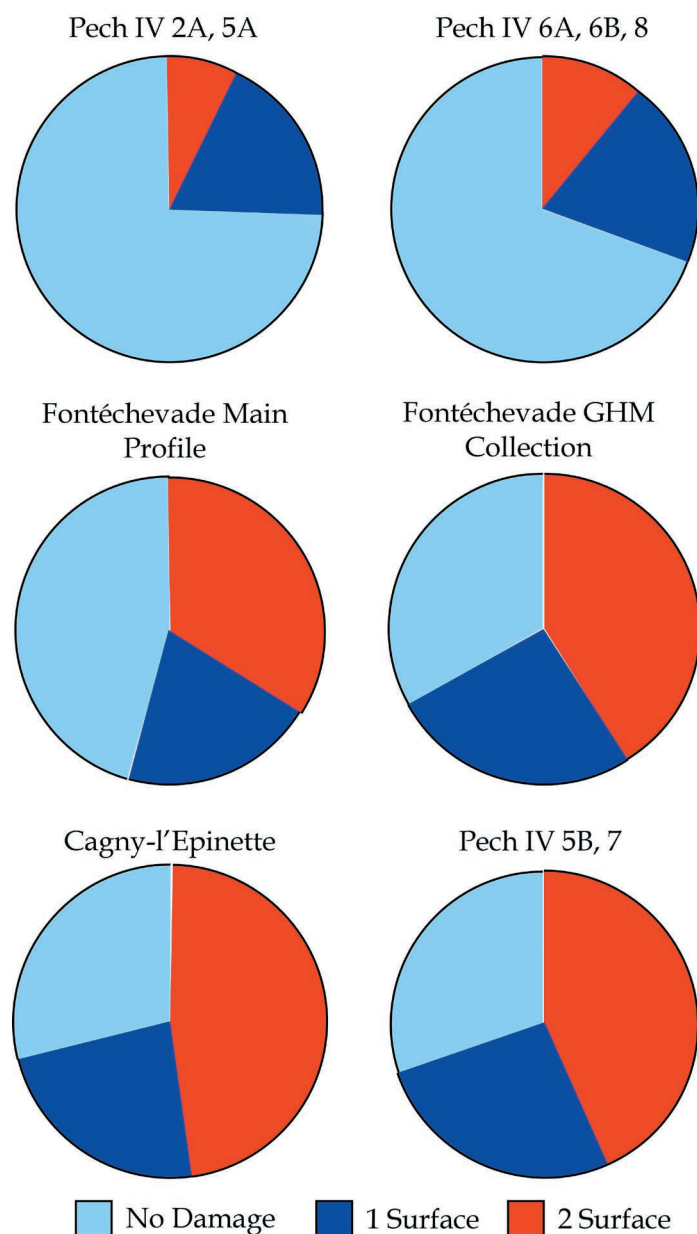


Figure 12. Pie diagrams indicating the kind and extent of damage on pieces from various sites. The material from Cagny-l'Épinette and Pech de l'Azé IV (levels 5b and 7) are known, on the basis of other studies, to have been significantly disturbed, and this is reflected by the high percentages of both 1-sided and 2-sided damage. The other material from Pech de l'Azé IV comes from contexts that show no other signs of disturbance. The material from both Fontéchevade collections indicates relatively severe disturbance.

own Fontéchevade collections from those of Henri-Marin. Two major groups can be distinguished. The first, which is composed of two sets of assemblages (levels 2A, 5A, 6A–B, and 8) from Pech de l'Azé IV (McPherron and Dibble 2000; McPherron et al. 2001), shows relatively little damage overall on the artifacts, and what damage does occur is most often one-sided. The second group, in which both collections from Fontéchevade are included, shows quite a bit more damage, with significantly more occurring on both surfaces. Regarding the lithic assemblage from Level II at

Cagny-l'Épinette, it was previously reported that this concentration of material was the result of fluvial action (Dibble et al. 1997), and there are clear indications that Levels 5B and 7 from Pech de l'Azé IV have been subjected to mass movement, particularly solifluction (P. Goldberg, personal communication). Thus the extent of damage on the lithics from Fontéchevade, which closely mirrors those from the other, disturbed, contexts, is consistent with a depositional model that entails significant movement of the material.

In addition to what is easily interpreted as damage, it is generally acknowledged that post-depositional artifact damage can potentially significantly alter an assemblage in ways that resemble real behavioral modifications, that is retouch (Bordes and Bourgon 1951; Bordes 1961:46, 1953; Dibble and Holdaway 1993; McBrearty et al 1998). This is especially true in the case of notched and denticulated types (Bordes and Bourgon 1951; Flenniken and Haggerty 1979; Nielson 1991). In this regard, it is again interesting that in both collections from Fontéchevade, notches and denticulates represent the dominant retouched type. Of course, these pieces could reflect purposeful modification, but the high proportion of them, coupled with so many other objects that are clearly the result of natural damage, suggests that in this case these types too are a result of the movement of material through the site.

Size Distributions

In the course of flintknapping a wide range of object sizes is produced, from large flakes, tools and cores, through smaller retouch or preparation flakes, down to microscopic particles. Thanks to a number of quantitative replicative experiments (Newcomer 1971; Shott 1994; see papers in Amick and Mauldin 1989) we know that the expected distribution of flake sizes in an undisturbed assemblage will show increasing frequencies of smaller sizes. Although the upper size range may vary, the general form of the distribution seems to hold true despite differing technologies or degree of core reduction. With this type of distribution, therefore, one expects to find many more small flakes than large ones. When the distribution of archaeological materials does not fit this pattern, particularly when the smallest objects are relatively rare, there are a number of possible explanations. First, it might suggest that very little lithic reduction took place on the site. Tools and flakes may have been brought to the site and discarded without much tool production or maintenance. Second, and alternatively, there are natural processes, especially water action, which can alter the expected distribution by selectively removing small flakes. As flow increases, water is capable of transporting increasingly heavy sediment loads, which means that increasingly larger flakes will be removed, or winnowed, from an assemblage and redeposited downstream as the flow energy eventually diminishes (Behm 1983; Schick 1986; Stein and Teltser 1989). Yet another possibility, and potentially the case here, is that the entire assemblage was created by natural depositional factors. In this case the size distributions of the artifactual material are more likely to match those of the non-artifactual material since the same processes were

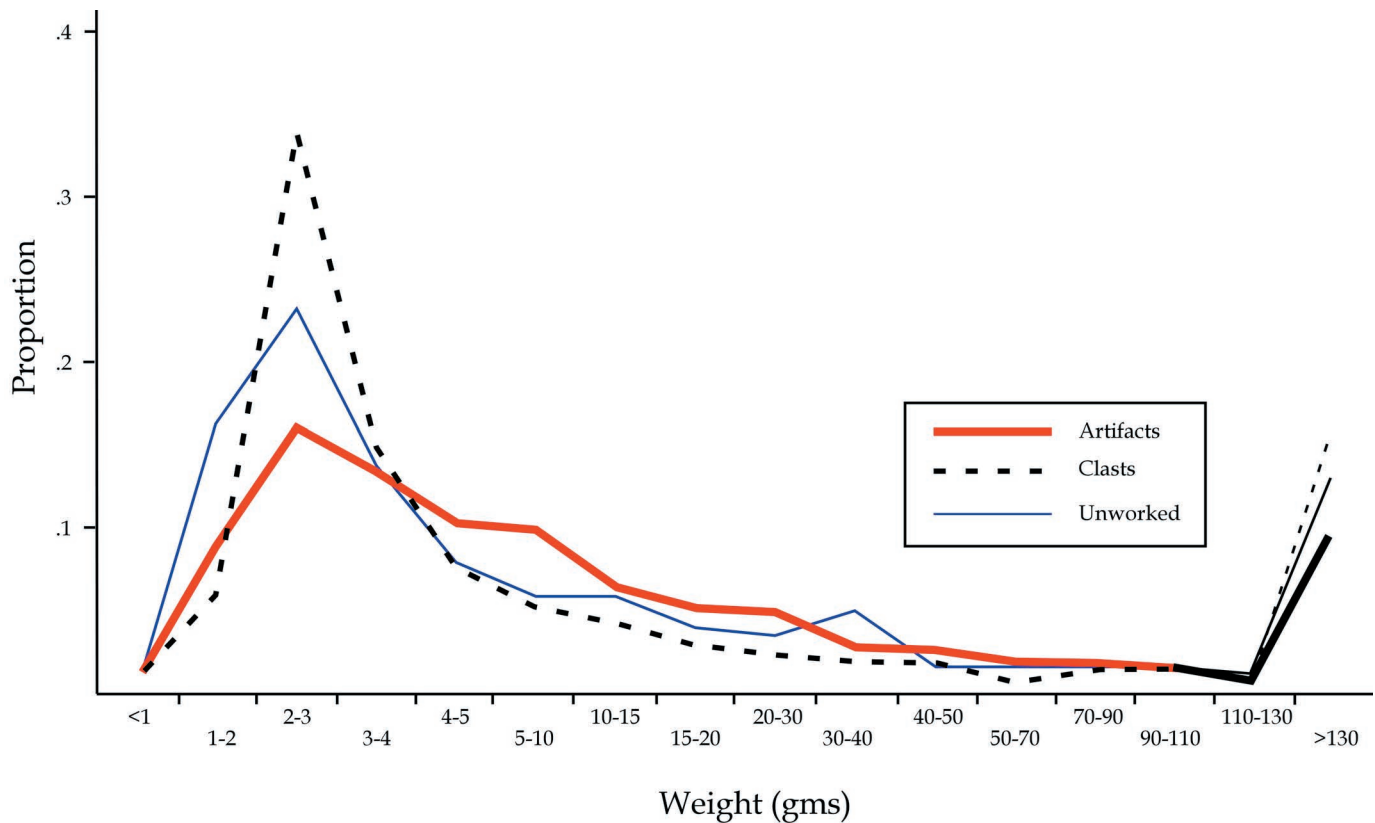


Figure 13. Comparison of weight distributions of artifacts (worked flint and chert), natural clasts (including quartzite), and unworked chert from the recent excavations in the Main Profile. The similarity in the distribution suggests that all three classes of material had a common origin and/or were subject to the same post-depositional processes.

responsible for their deposition.

It is clear from Figure 13 that the size distributions of the artifacts do not match the expected distribution for an assemblage representing in situ stone tool reduction as Henri-Martin had suggested. There are very few small flakes, and this is apparent even in relation to other non-artifactual objects in the sediment, some of which were naturally eroded from the cave walls. This point is further emphasized by 6 mm mesh wet-screening results that resulted in less than one small flake per 7-liter bucket of sediment. In other words, very small flakes are virtually non-existent. As described above, this is inconsistent with a typical workshop or occupation site where core reduction was taking place.

On the other hand, Figure 13 does show that the size distribution of the worked artifacts more or less matches size distribution of unworked chert and other clasts (primarily quartzite) greater than 2.5 cm in maximum dimension that were present in the sediment. This may mean that they are the result of similar depositional processes and that they may have washed in the sediments from the chimney in the back of the cave. Again, a similar relationship between the sizes of artifacts and non-artifactual material has previously been shown for the Acheulian site of Cagny-l'Épinette (Dibble et al. 1997), which was largely a product of stream action.

In this light, the abundant quartzite cobbles are par-

ticularly telling. There is no question that these materials must have been introduced into the site since quartzite is not part of the bedrock of the cave. The question, however, is whether they were deliberately introduced by the hominins to be used, as suggested by Henri-Martin, as hammerstones in exploiting the chert to be found within the cave, or whether they were introduced through natural agents via the chimney in the back of the cave. As mentioned earlier, the plateau over the cave contains large quantities of quartzite cobbles that presumably came from the Massif Central formations just east of this region.

If the cobbles were introduced by hominins, we would expect to see some sizes, for instance, cobbles that are large enough to serve as hammerstones but not overly large, preferentially introduced into the cave. As shown in Figure 14, however, there is a more or less smooth distribution of sizes, and this same distribution holds even for the overlying Bronze Age deposits when hammerstone use was not likely. Equally puzzling is the fact that in our excavations, where we exercised care to recover all of the cobbles, there are almost twice as many quartzite cobbles (N=605) as there are blanks (complete or proximal flakes or tools) made in the local material (N=344). Since one hammerstone is sufficient to produce many thousands of flakes, having more hammerstones than flakes is not an expected pattern for a raw material exploitation site. Finally, it is also the case that few of the quartzite cobbles showed any damage that

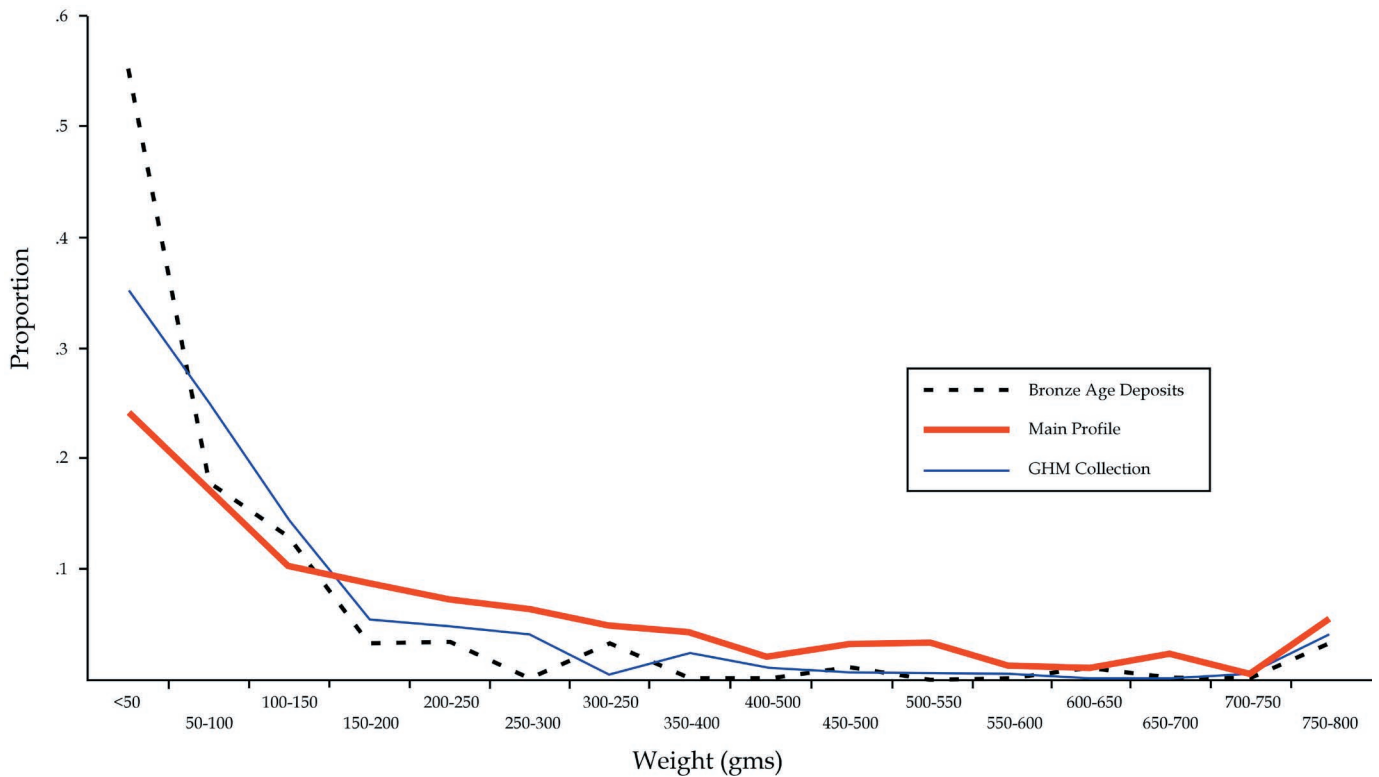


Figure 14. Comparison by weight classes of quartzite cobbles and pebbles from Henri-Martin's collection, the newly excavated material from the Main Profile, and material excavated from the Bronze Age deposits. All three contexts show a similar distribution, and without any evidence of selection for particular size classes to be used as hammerstones.

would suggest their use as hammerstones. While none of this provides conclusive proof that these cobbles were not introduced by hominins, the simplest explanation that best accounts for all of their aspects, including both their quantity and size distribution, is that they entered the cave through the same chimney as the sediments and the rest of the artifacts.

Orientations

Studies of clasts within a deposit have shown that their orientation can provide good information about depositional processes (see Lenoble and Bertran 2004 and McPherron 2005 and citations within). At Fontéchevade artifact orientations were recorded and analyzed following the methods described in McPherron (2005). Unfortunately, the exceedingly low artifact densities made it quite difficult to excavate a sufficiently large sample to do these kinds of analyses, and most of the levels could not be included in this analysis. Of the levels included, Level 1A is at the top of the sequence just under the present day surface of the deposits and is thought to have been disturbed in recent times. Levels 2A, 3A and 5 represent different portions of the main Tayacian deposits that nearly traverse the width of the cave. At the edges of the cave, however, there is a complete vertical break in the stratigraphy that is represented here as Level X.

The results are presented in Figure 15. In contexts that show little post-depositional disturbance, the Schmidt diagrams will show a continuous distribution of points along

the outer edge of at least half the diagram. This would be the case if artifacts were lying randomly oriented on a flat surface. Disturbances are indicated by artifacts that plot near the center of these diagrams (indicating artifacts that are nearly vertical) or by modalities in the patterning. Of the levels shown here, all but 3A show modalities to some extent and Level 3A has a sample size of only 29. The patterning is weakest in Level 1A and strongest in Level X.

This finding is summarized in the Benn diagram which is based on a kind of principal components analysis of the three dimensional orientations. Randomly oriented artifacts will produce equally weighted components and plot towards the isotropic corner of the diagram. Randomly oriented artifacts on a flat surface will have two components with high loadings and plot near the planar corner. And artifacts that point in only one direction have a single component with high loadings and plot in the linear corner (Benn 1994). Based on comparative data (Lenoble and Bertran 2004; McPherron 2005) the Fontéchevade levels plot at the limit between areas that at other sites are indicative of some post-depositional movement, in particular debris flow, and areas that are indicative of limited post-depositional movement.

FAUNAL EVIDENCE

The faunal remains, like the lithics, indicate that hominin activity in Fontéchevade was sporadic. It appears that the great majority of the faunal material entered the cave naturally. Carnivores and many of the lagomorphs undoubtedly

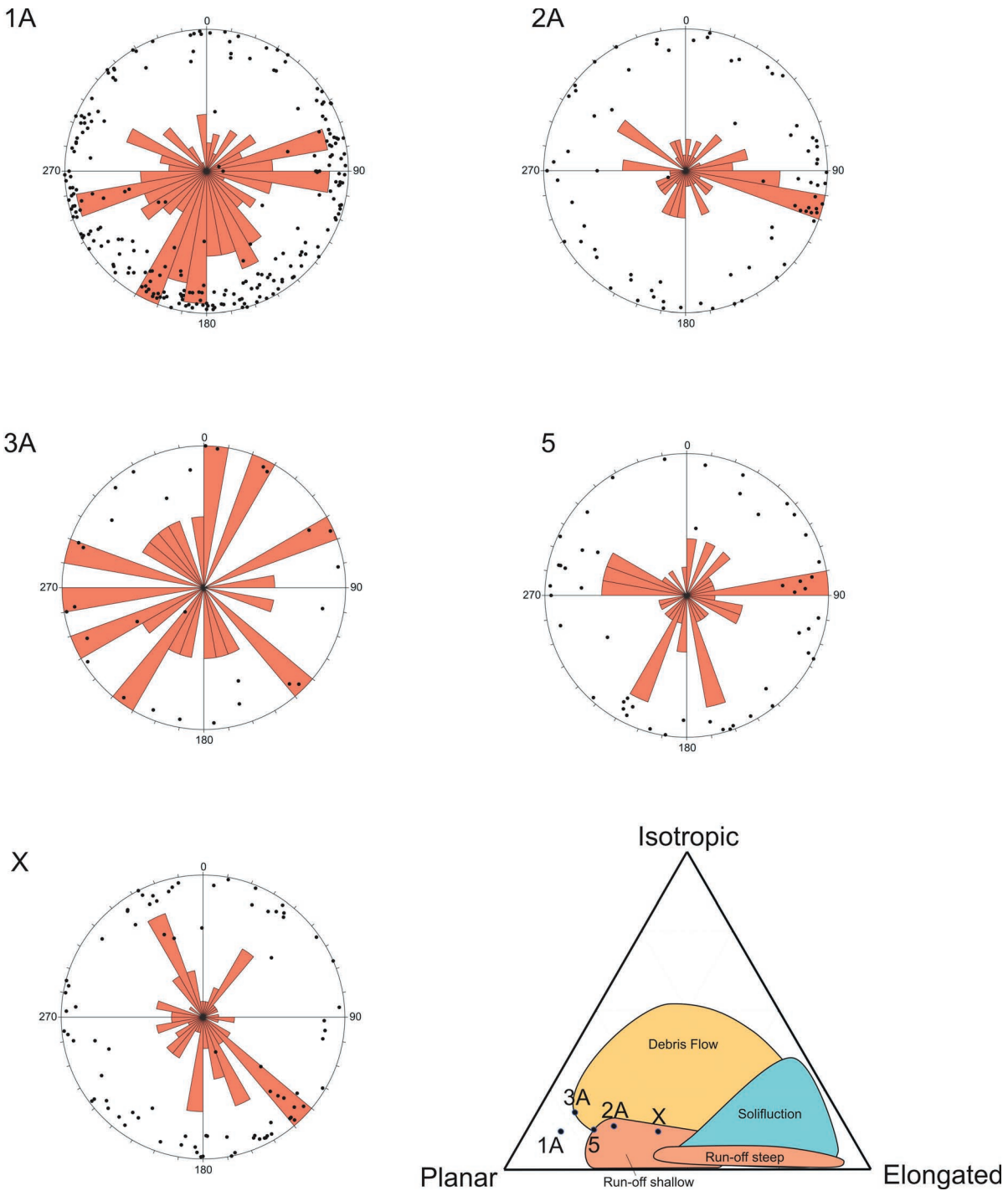


Figure 15. Schmidt diagrams (lower half) and Benn diagram of artifact orientations. The Fontéchevade grid is oriented such that the 0-180 axis is aligned with the cave and 180 degrees is towards the cave entrance.

ly entered the cave on their own and died there. The bulk of the ungulate remains appear to have been brought into the site by carnivores. Only a few show signs of hominin activity.

This is true of material from both Henri-Martin's and our own excavations. Fauna was not preserved in the in situ beds of the Main Profile of our excavations. The taphonomic analysis therefore is based on material from the presumably Tayacian beds of the Test Pit and the Witness

Bench. In addition, a sample of herbivore limb bones from Henri-Martin's collections was studied. These were not the material that she reported (Henri-Martin 1957), many of which were apparently chosen because she erroneously considered them to be examples of bone artifacts (Henri-Martin 1957:212-230). They were stored at the Musée des Antiquités National in boxes marked as unidentified or unidentifiable, as cooking debris, etc., although they did contain clearly identifiable specimens. It is clear that Henri-

Martin and her excavators did not save all faunal remains; it is almost certain, for example, that large specimens were more likely to be kept than small ones. This means that most of the statistical analyses that would normally be of use to zooarchaeological or taphonomic analysis could not be done.

Nonetheless, the zooarchaeological evidence for hominin activity is sparse. It consists of traces left on bones by stones and of fractures of the kind made in fresh bone by percussion or pressure. Of 152 specimens from our excavations of the Test Pit and the Witness Bed where it was possible to observe the presence or absence of stone tool marks, only four bore marks that were clearly made by contact of sharp stone edges on the surface of the bone (based on low resolution microscopic examination). There were eight more bearing marks that may or may not have been made in this way. Of the four bones with such marks, one was almost certainly made by humans using a stone as a tool; the rest were ambiguous. In sediments or on surfaces with considerable quantities of broken flint occurring naturally, there is a real likelihood of cuts, scratches, and scrapes occurring naturally (Lyman 1994:377-384). Thus isolated marks of this nature, especially light ones, short ones, or light wavering scrapes, are inconclusive evidence for butchering. At Fontéchevade, there was no pattern of either deep or repeated marks appearing where butchering marks are usually found (e.g., adjacent to joints). Thus, while it is impossible to reject a hominin origin for the marks made by stone on four bones or the marks on eight other bones that may have been made this way, it seems unlikely that they can all be attributed to hominin activity. These data are consistent with a sporadic use of the cave by hominins, but do not support a major hominin presence in the site.

From the sample of 511 bones excavated by Henri-Martin, there were 476 specimens on which evidence of butchering could have been observed (the surfaces of the rest were obscured in some way). Of these, only four had probable cut marks. There were 15 bones or bone fragments with a large number of light scratches scattered over the surface of the bone, which probably indicate trampling or sediment movement rather than hominin activity. In addition, there were nine specimens with questionable marks. These data indicate that hominin activity played a real but minor role in the formation of the faunal assemblage, less important than that played by carnivores.

The second line of evidence arguing against significant hominin occupation of the site consists of the kind of fractures caused by either percussion or pressure. These can be caused either by hominin or carnivore activity. The data are somewhat ambiguous, but there is some reason to believe that the majority of such breaks are attributable to carnivores. The percentage of green-bone fractures from Henri-Martin's excavations in the vicinity of the Diverticule (a side passage deep in the Tayacian levels) was 32.1 (Table 1). This was the highest of all the proveniences from her excavations and only slightly lower than the percentage from our excavations (37.3%). She interpreted this material as a carnivore den, due to a lack of evidence of hominin occupa-

TABLE 1. BONES WITH GREEN BONE FRACTURES FROM HENRI-MARTIN'S EXCAVATIONS.

BED*	N	PERCENTAGE		
		YES	NO	?
E0	2	12	81	7
E1'	23		100	
E1''	65	30	70	
E2'	85	20	68	12
E2''	81	15	81	4
DIV-51	107	32	60	7

* Inferred from depths marked on bones

tion. Her interpretation cannot be tested because it is impossible to locate material from her collections in terms of their horizontal provenience. However, if it is correct, then the similarity in green-bone fracture rates would imply only a very small human contribution in other parts of the site as well. The slightly higher percentage for our excavations may be due to the fact that we collected and studied all fragments of bone, including ones that would not have been included in the Henri-Martin sample.

Finally, Henri-Martin (1957) and Paletta (2005) did report the presence of shed antlers in Henri-Martin's excavations. While Paletta believes that some of these show evidence of human modification, data from dens without human occupation show that carnivores do collect antlers (Stiner 1991:113).

Overall, the faunal evidence indicates a very sporadic hominin occupation of the cave. This is consistent with Paletta's (2005) independent conclusions, based on her study of the faunal remains from Henri-Martin's excavations in bed E, that hominins were making occasional, short visits to the site in the course of hunting trips.

OTHER EVIDENCE

One aspect of her report that we have not yet discussed is her presentation of "living-floor" like arrangements of lithic workshops ("ateliers de silex") and hearths, some of which contained cave bear bones. Given what we know of the Lower and Middle Paleolithic in terms of the extreme rarity of spatial patterning such as this (Pettitt 1997), and given the rather coarse excavation techniques employed by Henri-Martin, such findings would be surprising. Based on what was presented earlier regarding the stone tools, however, including our study of her collection, it is impossible to consider that there were lithic workshops at the site. The most reasonable conclusion that can be reached is that some of the earlier finds were over-interpreted.

The evidence for hearths is more difficult to deal with mainly because in our own excavations we did not encounter any such features. In the Witness Bed in the front of the cave patches of darkly stained lenses of sediments were encountered, but these were concentrations of manganese,

which occurs in very high quantities in the sediments. In addition, chemical tests of the soils on the plateau have revealed concentrations of manganese high enough to impact the kinds of crops that could be grown there. Given what we know now that sediments from the plateau were entering the cave through the chimney, and given the presence of manganese in our own excavations, it is possible that Henri-Martin mistook these stains for hearths. This mistake has been made at other Paleolithic sites (Goldberg et al. 2001; Hill 1982; Genty et al. 1997; Shahack-Gross et al. 1997). Moreover, given the evidence presented here for substantial movement of the sediments, it is difficult to see how hearths, or lithic workshops for that matter, could have been preserved in such a depositional environment.

On the other hand, Henri-Martin (1957:234-344) does report on thermal analysis on samples of flint taken from these "hearths" and comparative samples from outside of them, which apparently showed heating to as much as 820° C. These are so incompletely reported, however, that they are impossible to evaluate, though heating to such a high temperature seems unlikely enough that the results may be questionable. What we can say, however, is that we were unable to substantiate her report of burnt flint and burnt bones in the collection. Not one burnt bone could be identified in her collections, and in the analysis of the stone tools, only 25 of 12,385 items showed possible evidence of heating and over half of these were non-artifactual pieces of flint. Thus, given all of these lines of evidence, the safest and most prudent conclusion is that Fontéchevade should be removed from the list of sites that provide evidence for hominin use of fire (cf. James 1989).

SUMMARY AND DISCUSSION

It should be clear from the preceding analyses that the Tayacian assemblages at Fontéchevade are primarily the result of natural formation processes. These processes probably introduced some modified artifacts into the site and clearly also produced pseudo-artifacts that were originally interpreted as artifacts. It is the combination of damaged and pseudo-artifacts that became the most representative feature of assemblages known as Tayacian.

Two natural processes were acting more or less simultaneously. The first was the movement of sediments and other materials from the overlying plateau through one or more openings in the back of the cave. This was undoubtedly the origin of the quartzite cobbles, for example, as there is simply nothing about them to suggest that they were intentionally introduced into the site by hominins. It also is the most likely source of the flint artifacts, especially given the extent of damage on them. Although there are no known Paleolithic sites on the plateau, it is clear that, after more than a half million years of occupation, there is a light density background of Paleolithic artifacts everywhere—what archaeologists sometimes call the "scatter between the patches" (Stern 1991, 1993). Even the so-called hearths were for the most part probably just concentrations of manganese, which also came from the plateau.

The second natural process responsible for the creation

of at least part of the assemblage was the dissolution of the cave itself, which resulted in the release of chert nodules into the sediments. These nodules tended to break apart, either through mechanical action as they fell or, primarily, through thermal (frost) fracture. In fact, the cave sediments are filled with pseudo-artifacts in this material and admittedly, it is sometimes difficult to tell the difference between these "geofacts" and intentionally produced flakes; this is perhaps why the Henri-Martin collection contained so many unworked pieces. After deposition, all of these artifacts were then subject to the same natural processes moving sediment through the cave system.

There is some evidence that the cave was occasionally used by hominins. The stratigraphic succession of Mousterian, Upper Paleolithic, and Bronze Age at the top of the sequence argues for hominin use of the cave during those times (though each of those levels may have its own taphonomic issues, which would now be impossible to assess since so little of these deposits remain). Moreover, within the Tayacian, there is some evidence of sporadic occupation in the form of rare signs of butchering or burning of bone. Perhaps some of the lithic artifacts in the Tayacian are the result of hominin use of the cave as well. The problem, however, is that against the background of material that is clearly out of place, it is impossible to identify on a piece-by-piece basis which ones represent sporadic use of the cave and which were introduced by other means.

Taking all these lines of evidence together, the Tayacian of Fontéchevade cannot be interpreted as the result of hominin behavior. It is best interpreted as mixed accumulation of lithic and other material—some artifactual, some not—resulting primarily from purely geological processes. The lack of any distinguishing characteristics of this material is, therefore, not surprising, nor is the general lack of sophistication or refinement in both the technology and the few tools that do exist there.

Clearly this interpretation is substantially different from Henri-Martin's (1957) in many ways and it is difficult to reconcile our results with much of what she reported. On the other hand, clues to problems with the site are apparent in her publication. We have already discussed, for instance, the incredibly low density of artifactual material in light of the volume of sediment excavated and the inclusion of such non-standard types as "parallelepipeds" and "cubes"—lithics that clearly are not artifacts—in her discussion of the lithic reduction technology of the site.

The bottom line is that Fontéchevade was excavated, analyzed and published in a time when there was relatively little consideration of alternative, non-hominin, explanations for the accumulation and distribution of material remains found in caves when those caves also contain unambiguous stone tools and, in this case, hominin remains. This is not the first time, and undoubtedly not the last, that the application of taphonomic methods results in a major re-interpretation of archaeological remains.

If Fontéchevade has these issues of interpretation, do other Tayacian sites, many of which were defined based on comparison with Fontéchevade, also have these problems?

Obviously, the answer to this question will require more detailed taphonomic studies of these sites, though as mentioned above, similar arguments have already been put forward for some of them where relatively dynamic sedimentary contexts, including fluvial transport, karstic slumping, and other kinds of mass movement, may have created these assemblages or contributed significantly to their character. At this point, however, it would seem to be fair to conclude that unless it is explicitly shown not to be the case, Paleolithic stone tool assemblages that compare favorably with Fontéchevade should not be considered as unambiguous reflections of prehistoric behavior.

We conclude, therefore, that the use of the term Tayacian should be dropped. In this regard, it can join the OSTEODONTOKERATIC as an example of an industry that simply isn't.

FURTHER IMPLICATIONS

There is more to the Fontéchevade story than this, however, since this interpretation of the Tayacian as being primarily of natural origin has much broader implications. While it could be argued that the example of Fontéchevade is only an isolated one, it does demonstrate that Paleolithic archaeologists need to be careful in terms of how they interpret assemblages in anthropological terms. At the beginning of this paper we raised the question of the extent to which we can assume that named entities in the Paleolithic represent and reflect purposeful behavior of anthropological significance. As anthropologists, we want to use lithic assemblages to reconstruct past human adaptations. It is partly on this basis that we can move forward to understand better the various factors that were responsible for the direction of human evolution during the Pleistocene. There is no question that these are worthy goals and we should continue to pursue them.

However, the concept of "industry," as the term is most often used in Paleolithic archaeology, is becoming increasingly problematic. Fundamentally, industries are sets of similar lithic assemblages that recur over varying geographic areas and over varying time spans. In this, they resemble the archaeological "cultures" of later periods. However, for the Lower and Middle Paleolithic, there is good reason to doubt that assemblage variability stems from the same causes as often appears to be the case in later time periods. More specifically, it is increasingly doubtful that "culture," in the sense of community-defined standards of appropriate artifact design, is the most appropriate explanation of the morphology or appearance of individual artifacts or many of the defining characteristics of a particular industry (Chase 1991, 2001, 2006).

Such standards will affect artifact form only in the context of symbolic cultural concepts, beliefs, and norms that affect almost everything a people perceive, think, and do. This is clearly the context in which all living human populations live their lives. However, in the earlier parts of the Paleolithic, when other evidence for such a context is lacking, it is quite possible that similarities in the way artifacts were made represent nothing more than ways of accom-

plishing certain practical goals that were socially learned but devoid of any symbolic, cultural meaning. In fact, many, if not most, differences in the appearance of artifacts within a single class (scrapers, bifaces, etc.) probably do not represent any intention at all, symbolic or otherwise, on the part of the maker. They probably reflect only reduction of an artifact, through resharpening, to the point of uselessness (e.g., Dibble 1995b; Holdaway et al. 1996; McPherron 1994, 1999). In the case of the Tayacian of Fontéchevade, behavior has very little to do with it; here the assemblage, and most likely an entire named industrial "tradition" is largely of natural origin.

There are other reasons to be skeptical of cultural interpretations of earlier Paleolithic industries. In a symbolic, cultural context, styles change relatively rapidly. Yet most pre-Upper Paleolithic industries lasted many tens or even hundreds of thousands of years, and for the Acheulian and Oldowan, more than a million years each. Such long-lived and conservative patterns of behavior, in the face of major geographic and environmental variability, are not consistent with cultural variation. For these reasons, basing interpretations of cognitive, cultural, or social evolution on lithic industries is problematic.

Admittedly, some of this problem may be due to the coarse resolution of Lower and Middle Paleolithic assemblages. Paleolithic stratigraphic horizons, defined geologically, are typically quite thick and can represent several hundreds, thousands, or even tens of thousands of years. An excavated assemblage, in effect, collapses all of this time and treats it more or less as a single temporal event (McPherron 2005; Stern 1993, 1994) or an "occupation." But, given the enormity of time that is reflected in a particular assemblage, it has to be asked whether or not it is realistic to assume that the behaviors that led to its formation were constant. This is not an argument for either side of the style/activity debate; rather, the problem is that our units of analysis—*assemblages* that are defined on the basis of geology—can only be taken as a cumulative sum of several discrete events, both behavioral and natural.

The problem, however, is in the nature of our evidence. Given all the fundamental problems surrounding the definition of a single assemblage, especially one that it is formed over geological time and reflects processes that operate over geological time, it is hard to isolate particular occupations or discrete behavioral patterns—both of which are necessary to define or recognize a particular adaptive tradition. To some extent, it is no surprise, therefore, that groups of assemblages are defined as industries on the basis of relatively simple criteria, especially the relative proportions of different lithic tool types, which in turn leads to their recognition throughout immense spans of time and space. While there may be aspects of them that reflect shared traditions among hominins, isolating those shared traditions has proven difficult at best.

This, then, represents the crux of the problem that is being exemplified here with the Tayacian of Fontéchevade: is the evidence at hand, coupled with our methods of acquiring and analyzing it, sufficient to address the issue of the

extent to which patterns in the archaeological record reflect shared cultural traditions? We have to conclude that it is not. This is not to say that the evidence shows a lack of such traditions, but simply that it cannot be simply assumed that the patterns apparent in the archaeological record are a result of such behavior.

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