M. OTTE et L.G. STRAUS (dir.), *Le Trou Magrite. Fouilles 1991-1992*. Liège, E.R.A.U.L. 69, 1995.

4

ARCHEOLOGICAL DESCRIPTION OF THE STRATA

Lawrence Guy STRAUS

The nature and composition of the cultural remains of each stratum are described individually in this section. Included here is discussion of the preservation, context, distribution and classification of the artifacts within the distinctive stratigraphic units. Later sections provide discussions of lithic raw materials, inter-strata comparisons and aspects of technological operatory systems/reduction sequences (*chaînes operatoires*). Detailed statistical comparisons and three dimensional spatial analyses, as well as faunal analyses, are provided in separate chapters (see Miller and Mishoe, Martinez, Gautier, Cordy, this volume).

STRATUM 1

Stratum 1 as noted above, contains a mixture of modern, submodern and Paleolithic artifacts and faunal remains. It is the product of erosion and scattering of backdirt from "generations" of excavation and looting in the cave, as well as humus and incipient topsoil formation. Possible testimony to the existence of the now totally destroyed Gravettian or Magdalenian deposit is the discovery of a mesial fragment of a narrow backed blade that could have been a Gravette point (Figure 4.1). Such pieces are absent from Strata 2 and 3.

STRATUM 1.1

Stratum 1.1 is a large pit feature as described above and probably relates somehow to the Iron Age and Mesolithic materials apparently found by Toussaint just to the east of our Trench C (Figures 2.12 & 2.15). This pit is apparently intrusive into Aurignacian Stratum 2 and bottoms out on Stratum 3. It probably had also cut through overlying later Paleolithic levels, although we do not specifically know that the Gravettian and Magdalenian deposits had originally extended this far forward toward the top of the talus in front of the cave. Maximum extant depth in the J9/10 section is 55 cm. The pit fill is distinguished by a fine, powdery, brown silt and a number of medium-size limestone blocks. Actual age, original size and function of this large feature are

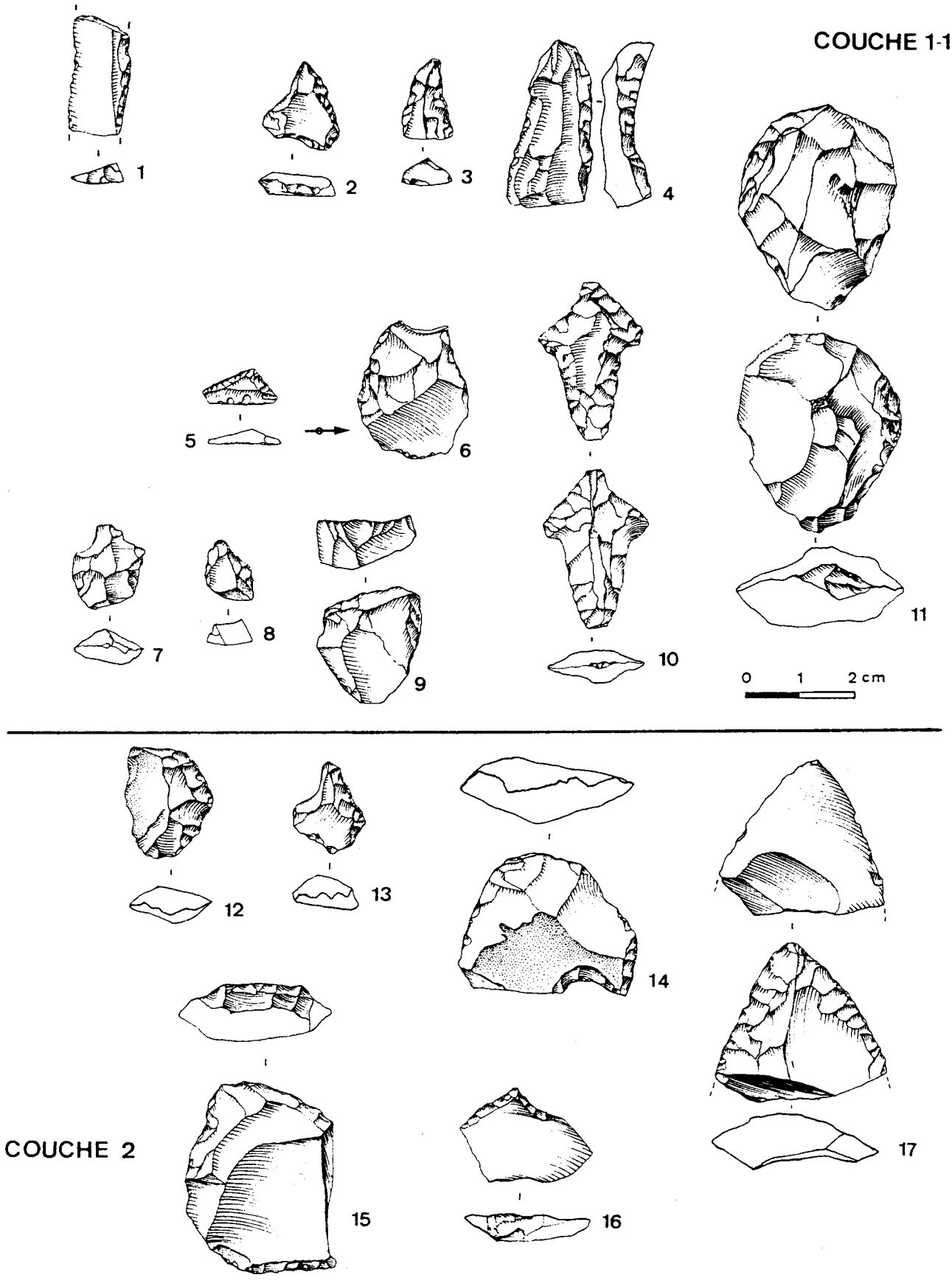

Figure 4.1. 1-11 : stratum 1.1; 12-17 : stratum 2 (for details, see captions after References).

unclear, although use as an *in situ* combustion structure can apparently be ruled out. No modern or submodern objects were found in the Stratum 1.1 pit, so it probably does not represent a recent excavation. This conclusion is supported by the fact that it is overlain by Stratum 1 humus and backdirt. Given the absence of Mesolithic, Neolithic and Iron Age materials elsewhere in the Trench C area, it would seem likely that the pit is of early-mid Holocene age. The fact that the pit seems to have cut through an intact Mesolithic level (represented by the Stratum 1.3 remnant deposit), suggests that the pit's inception dates to at least the Neolithic, but probably later. There are areas of recent excavation to the north and east of the Stratum 1.1 pit, the latter possibly the edge of Toussaint's sondage.

Archeological contents of the Stratum 1.1 pit are clearly mixed. They include a Neolithic arrowhead (plus another similar piece from Stratum 1 sediments nearby) (Figure 4.1 : 2-11), a geometric triangle, Mesolithic-type perforator-bec, another perforator similar to ones of Magdalenian age at nearby Chaleux, a small bifacial ("mini-Levallois") flint core, vitrified slag, bits of brick (or other fired clay), and a few sherds of Iron Age and even possible Medieval date from contexts that could be either Stratum 1 or 1.1 (identifications by E.Teheux). Altogether there are 13 lithic tools from Stratum 1.1 (Table 4.1). (As noted above, the small remnant of Stratum 1.3, through which the 1.1 pit was cut, yielded 3 tools of apparent Mesolithic age.) In Stratum 1.1, 71 items of debitage were also recovered mainly flakes, plus a few blades and bladelets and several chunks (Table 4.2). The pit fill also included teeth of boar or domesticated pig, wolf and possible hyena, and remains of sheep/goat, ibex and possible horse clearly a mixed fauna (see Gautier, this volume).

STRATUM 2: ARCHEOLOGICAL CONTEXT

Stratum 2 is archeologically and paleontologically the richest level in the Trench C area of le Trou Magrite. Despite the facts that it had apparently been cut into during the promenade construction of the 1830's and that much of it was shielded from the modern surface by only a thin mantle of recent humus and backdirt from generations of diggings in the cave mouth, Stratum 2 and its contents are remarkably intact and uncontaminated. Human occupation residues (including possible remnants of living surfaces) dating from 30-27,000 years ago have been lying undisturbed and apparently in place within a few centimeters of a surface that had been walked on and in an area adjacent to zones of massive excavation and disturbance during a period of more than a century.

There are several cases in point of the remarkable preservation of Stratum 2, despite proximity to the base of the 1830's promenade leveling and considerable subsequent disturbance. In G6 a virtually complete reindeer maxilla (5 teeth and parts of the alveolus) was found in Stratum 2 gravels only a few centimeters below the duff, humus and backdirt of Stratum 1 near the eastern cave mouth wall. In I6A, within partially loose, partially cemented Stratum 2 gravels, 7 incisor teeth of a juvenile cervid were found next to one another (5 of which were still lined up in anatomical position, although the alveolar bone had disintegrated at some time after deposition). In I6C+D several large cervid molars

TABLE 4.1 :
TROU MAGRITE (1991-1992)
UPPER PALEOLITHIC TOOLS

Strata

	1.1		2			3			4	
TYPE	No.	%	No.	%	cum. %	No.	%	cum. %	No.	%
1	1	7.7	1	0.8	0.8	1	0.8	0.8		
2			4	3.3	4.1	3	2.5	3.3		
3						2	1.7	5.0		
4						2	1.7	6.7		
5			4	3.3	7.4	6	5.0	11.7		
6			1	0.8	8.2					
8	(1)		14	11.5	19.7	4	3.4	15.1		
10	(1)		2	1.6	21.3	1	0.8	15.9		
12			1	0.8	22.1	7	5.9	21.8		
13			1	0.8	22.9	1	0.8	22.6		
14						2	1.7	24.3		
18			2	1.6	24.5					
19						2	1.7	26.0		
21			1	0.8	25.3					
23	2	15.4								
24			1	0.8	26.1	2	1.7	27.7		
25	1	7.7	1	0.8	26.9					
26	(1)		2	1.6	28.5	1	0.8	28.5		
27						1	0.8		1	20.0
30			1	0.8	29.3	3	2.5	31.8		
31						1	0.8	32.6		
44									1	20.20
58						1	0.8	33.4		
62						1	0.8	34.2		
65	1	7.7	26	21.3	50.6	21	17.6	51.8	2	40.0
66			9	7.4	58.0	5	4.2	56.0		
67			2	1.6	59.6					
69			2	1.6	61.2					
70						1	0.8	56.8		
74	3	23.1	17	13.9	75.1	32	26.9	83.7	1	20.0
75	2	15.4	14	11.5	86.6	12	10.1	93.8		
76						1	0.8	94.6		
77			15	12.3	98.9	4	3.4	98.0		
78	1	7.7				2	1.7	99.7		
79	1	7.7								
90			1	0.8	99.7					
92	1	7.7								
			2							
TOTAL	13	100.0	122	100.0		119	100.0		5	100.0
SAGAIE			2							

N.B. Numbers in () are from stratum 1.3

UPPER PALEOLITHIC TOOL TYPES

1	Single endscraper
2	Atypical endscraper
3	Double endscraper
4	Ogival endscraper
5	Endscraper on retouched flake/blade
6	Endscraper on Aurignacian blade
8	Endscraper on flake
10	Unguiform endscraper
12	Atypical carinated endscraper
13	Thick nosed endscraper
14	Flat nosed/shouldered endscraper
17	Endscraper-burin
18	Endscraper-truncated piece
19	Burin-truncated piece
21	Perçoir-endscraper
23	Perçoir
24	Bec
25	Multiple perçoir/bec
26	Microperçoir
27	Straight dihedral burin
30	Angle on break burin
31	Multiple dihedral burin
35	Burin on oblique retouched truncation
44	Plan burin
48	Gravette point
58	Completely backed blade
62	Concave truncated piece
65	Piece with continuous retouch -1 edge
66	Piece with continuous retouch -2 edges
67	Aurignacian blade
69	Solutrean type pices
74	Notch
75	Denticulate
76	Splintered piece
77	Sidescraper
78	Raclette
79	Triangle
90	Retouched (Dufour) bladelet
92	Other

TABLE 4.2
TROU MAGRITE LITHIC DEBRIS (1992)

Strata

	1.1		2		3		4		5	
TYPE	No.	%	No.	%	No.	%	No.	%	No.	%
1	17	23.9	1042	20.0	564	21.6	18	12.8	5	4.5
22			11	0.2	1	0	1	0.7	1	0.9
2	4	5.6	649	12.5	117	4.5	7	5.0	1	0.9
23			4	0.1	1	0				
3	24	33.8	2413	46.4	1489	56.9	70	49.6	49	44.5
4	1	1.4	49	0.9	21	0.8	2	1.4	3	2.7
5	2	2.8	115	2.2	46	1.8			9	8.2
6	3	4.2	159	3.1	73	2.8	7	5.0	7	6.4
24	3	4.2	223	4.3	63	2.4	5	3.5		
7	1	1.4	13	0.2					1	0.9
8	1	1.4	20	0.4	3	0.1				
27	1	1.4	4	0.1	8	0.3	1	0.7		
9	2	2.8	76	1.5	58	2.2	1	0.7	2	1.8
25	2	2.8	63	1.2	8	0.3				
28			4	0.1						
29			2	0	2	0.1				
10	1	1.4	6	0.1	2	0.1				
11										
12			2	0	1	0				
13	2	2.8	10	0.2	8	0.3	1	0.7	4	3.6
14			1	0						
15										
16										
17			1	0						
18			18	0.3	1	0			1	0.9
19	7	9.9	273	5.2	115	4.4	25	17.7	21	19.1
20			31	0.6	17	0.7	1	0.7	5	4.5
21			15	0.3	16	0.6	1	0.7	1	0.9
							1	0.7		
Total	71	100.0	5204	100.0	2614	100.0	141	100.0	110	100.0

LITHIC DEBRIS TYPES

1	Non-cortical Trimming Flake	≤ 1 cm w/Hertzian morphology w/o cortex
22	Cortical Trimming Flake	w/some cortex on dorsal surface
2	Non-Cortical Shatter (small angular debris)	≤ 1 cm w/o Hertzian morphology w/o cortex
23	Cortical Shatter	w/some cortex
3	Plain Flake	> 1 cm, no cortex
4	Primary Decortication Flake	cortex covers dorsal surface
5	Secondary Decortication Flake	some dorsal cortex
6	Whole or Proximal Plain Blade	> 2 cm twice as long as wide - whole or proximal fragment (w/definite butt), no cortex
24	Broken Plain Blade	w/o cortex-mesial or distal fragment
7	Whole or Proximal Primary Decortication Blade	L≥ 2 x W & L> 2 cm, cortex covers dorsal surface
8	Whole or Proximal Secondary Decortication Blade	L≥ 2 x W & L> 2 cm, some dorsal cortex
27	Medial/Distal Cortical Blade	like #24, but w/some cortex
9	Whole or Proximal Plain Bladelet	≤ 2 cm long, narrow, & thin - whole or proximal fragment, w/o cortex
25	Broken Plain Bladelet	like #9, but w/o cortex - mesial or distal fragment
28	Medial/Distal Cortical Bladelet	w/some cortex

29	Whole/Proximal Cortical Bladelet	like #9, but w/some cortex
10	Burin Spall	tri - or quadrangular section, thick
11	Unidirectional Crested Blade	crest formed by flake scars perpendicular to blade axis in both directions
12	Bidirectional Crested Blade	ditto-but in only one direction
13	Flake Core	core with only flake removals
14	Prismatic Blade Core	cylindrical core with only blade removals
15	Pyramidal Blade Core	pyramidal core with only blade removals
16	Prismatic Bladelet Core	cylindrical core with only bladelet removals
17	Pyramidal Bladelet Core	pyramidal core with only bladelet removals
18	Mixed Core	both flake and blade/bladelet removals
19	Non-cortical Chunk (large angular debris)	> 1 cm, w/o flake morph., (ie. no bulbs) includes core remnants & fragments of exhausted cores, w/o cortex
26	Cortical Chunk	like # 19, but w/some cortex
20	Platform Renewal Flake	has lip of platform, nibbling-core preparation
21	Pièce Esquillée (splintered)	bipolar flake or core remnant

and premolars were found together in anatomical order with bits of mandibular bone under and next to them. In this same area (I-J6), where cultural and faunal remains were distributed particularly densely on distinct ancient land surfaces, there were several limestone blade fragments, two of which (from I6) refitted (despite rock surface erosion) and others of which almost conjoined. Square I5 produced two plain flakes that were also refitted by A.Martinez.

Although Stratum 2 faunal elements are dominated by denser, more durable teeth and bones and the proportion of bones too fragmented to be identifiable is very high, there are some relatively fragile bones that are preserved (rib, pelvis), again testifying to the intact state of Stratum 2. (Among the faunal remains in the dense clusters of I6 is a relatively fragile mammoth molar enamel plate.) There is a total of 6,833 mammal remains, 206 of which are identifiable (3%). Total bone weight is 6,934 gm., for an average weight of 1.0 gm., showing that most of the faunal remains are small bone splinters resultant probably from both human processing and geological crushing. The ratio of lithic artifact (108,980 gm.) to faunal weight is a high 15.7 to 1, probably testimony to the length and intensity of human occupation/ activity at le Trou Magrite at this time, despite the relatively good faunal preservation. Cut marks (11 bones) and burning traces (16 bones) are relatively frequent, although there are also 28 carnivore-gnawed bones. Cave bear, badger, wolf and especially two species of fox are present in Stratum 2.

Artifacts in square I6 and elsewhere in Stratum 2 consistently have calcium carbonate crust on the bottom only, indicating that the pieces have been lying undisturbed at least since the time of CaCO3 precipitation. As noted earlier, this precipitation affected the base of Stratum 2/top of Stratum 3 at the northern edge of Trench C, and created a "flowstone" deposit that generally slopes down away from the cave and cliff toward the talus, permeating even areas of Stratum 4 especially in the western sector of the excavation zone.

Despite the existence of distinct lenses of well-preserved materials within the gravels of Stratum 2, not only in I-J6 but also elsewhere throughout much of Trench C, we did not detect any traces of features (pits, hearths, postholes, etc.). However this may be due to the relatively small and peripheral area of the once large site that we excavated, particularly, since at the time of Stratum 2 deposition, most of the Trench C area would have been in front of the dripline and exposed to the elements (as it is today). The area concerned may have been one of activities requiring open space (butchering, tool manufacture), but it may also often have been simply a dumping zone for the disposal of bulky or noxious waste (notably animal carcass parts) from the more intensive activity areas in the covered cave entrance and interior.

CHRONOSTRATIGRAPHIC POSITION

The cryoclastic nature of the Stratum 2 eboulis suggests that the deposit was formed under freeze-thaw conditions, implying cold and some degree of humidity certainly much colder, but also somewhat drier than during the times

of formation of Strata 4 and 5 (see Haesaerts, this volume). The fauna of Stratum 2 also imply the existence of cold and not very humid climatic conditions, with open, arctic steppe/tundra vegetation (arctic fox, mammoth, woolly rhino, horse, ibex and dominant reindeer absence of red or roe deer). However the modest presence of boar (8 remains) suggests that conditions were not too extreme and that there were at least local gallery thickets along the Lesse and the southfacing side of its valley, despite the overall rigor of conditions at 50 degrees North latitude during Stratum 2 times (see Gautier, this volume).

The presence of Upper Paleolithic types of blades and tools (notably types attributable to the Aurignacian techno-complex) suggests that Stratum 2 should lie in the late part of oxygen isotope stage 3, toward the end of the Würm Interpleniglacial.

Five radiocarbon dates are available from Stratum 2 (Table 4.3). Together with the dates from Stratum 3, the 3 bone gelatin dates give a credible (albeit less than optimally precise) estimate of the age of Aurignacian occupations of le Trou Magrite. For Stratum 2, the accelerator date of 17.9 kya was done on many small flecks of charcoal and must be contaminated with bits that had percolated from above including perhaps some from the now absent Gravettian, Magdalenian and even Mesolithic levels. This would be easy to understand given the coarse, open nature of the Stratum 2 gravel deposit and the fact that the aggregate sample came from the upper part of the level. All the conventional bone dates were done on pooled unidentifiable bone splinters from individual or adjacent squares and spits. The date of 22.7 kya is on bone apatite, generally considered an unreliable fraction for dating. The total bone gelatin from the same sample yielded a date of 26.6 kya which, given the large standard deviation of 1.3 ky, would seem to be a reasonable end date for Aurignacian occupation of le Trou Magrite. Total bone gelatin dates of 30.1 and 34.2 kya from the lower part of Stratum 2 which, with their large standard deviations, could well imply an age of around 32 kya and confirm a conclusion that this deposit was probably formed between about 32/34-28 kya. Given the thickness of the deposit and its chronometric age range, Stratum 2 clearly represents a significant palimpsest of many human occupations, as well as a lengthy period of meteorization of the cave roof.

The Stratum 2 dates are very similar to two conventional dates from the upper of two Aurignacian levels (B) at the site of le Trou Walou in eastern Belgium, currently under excavation by M.Dewez. These dates are 29.8+0.8 and 29.5+0.6 kya (Lv-1587 and 1592)(Dewez 1989). Chronologically Trou Magrite Stratum 2 immediately precedes the Gravettian occupations at the major open-air localities of Maisières-Canal near Mons (some 70 km. to the west-northwest) and Huccorgne near Huy (45 km. to the northeast). Although there are several dates from Maisières, with some incoherence among them, the archeological horizon is generally thought to be best dated by a determination of 28 kya (GrN-5523)(Haesaerts and Heinzelin 1979; Dewez 1989). The Gravettian of Huccorgne is now dated by several determinations ranging from 28-23 kya (Noiret, Otte, Straus *et al.* 1994). Stratum 2 at le Trou Magrite thus seems to mark the end of the Aurignacian techno-complex and the development of the artifacts (especially the

TABLE 4.3 :

RADIOCARBON DATES FROM LE TROU MAGRITE

Stratum	Material Dated	Method	Lab No.	Date BP	± 1 SD	Range @ 2 SD
2 top	charcoal	AMS	OxA-4040	17,900	200	18,300-17,500
2	bone apatite	Conv	GX-17017A	22,700	1150	25,000-20,400
2	bone gelatin	Conv	GX-17017G	26,580	1310	29,200-23960
2 base	bone gelatin	Conv	GX-18538G	30,100	2200	34,500-25,700
2 base	bone gelatin	Conv	GX-18537G	34,225	1925	38,075-30,375
3	bone gelatin	Conv	GX-18540G	27,900	3400	34,700-21,100
3	bone gelatin	Conv	GX-18539G	>33,800	-	-
3 mid	aspartic acid*	AMS	CAMS-10352	41,300	1690	44,680-37,920
4a	aspartic acid*	AMS	CAMS-10358	30,890	660	32,210-29,570
4a	aspartic acid*	AMS	CAMS-10362	21,550	190	21,930-21,170
5	aspartic acid*	AMS	CAMS-10356	12,450	250	12,950-11,950

T. Stafford observations on protein preservation in CAMS samples :

+ : very well preserved bone : % Nitrogen = 1.74;
protein preserved almost like modern protein;

* : very poorly preserved bone : protein leached out.

lithic weapon tips) characteristic of the Gravettian techno-complex in this part of Europe.

THE ARTIFACT ASSEMBLAGES

Stratum 2 yielded 5204 items of knapping debris: 30 cores, 304 chunks and 4870 flakes, blades and bladelets of various kinds (Table 4.2). It also produced 122 retouched tools classified within the standard typology of D.de Sonneville-Bordes and J. Perrot (Table 4.1) and two fragments of different antler sagaies.

The ratio of debris to tools is a fairly high 42.7 to 1. The lithic tool assemblage is dominated by non-local, good- quality flint (69% by count, 44% by weight), with a minority of tools being made on hard local limestone (22% by count, 48% by weight). In contrast, the knapping debris (cores plus debitage) has proportionally less imported flint (59% by count, 11% by weight) and more limestone (33% by count, 86% by weight)(see Chapter 5 Appendix for ad hoc descriptions of lithic types).

Fully 33% of the Stratum 2 debris are small (<1 cm.) trimming flakes (chips) and pieces of shatter (small angular debris), i.e., microdebitage. Another 50% are regular flakes (plain and cortical). Regular blades and bladelets make up only 11% of the total (bladelets=3%). Cores per se make up only slightly more than 0.5%, while chunks (large angular debris that may be fragments of cores or exhausted cores in some cases) equal slightly less than 6% of the knapping debris total. In addition there are 2 bidirectional crested blades and 15 platform renewal flakes, together accounting for only slightly more than 0.3%.

Debitage with any cortex makes up only 4.3% of the total debris. However, nearly 15% of the tool blanks have cortex, suggesting great economization of hard-to-obtain flint which was favored and imported for tool manufacture. The ratio of large debitage (excluding trimming flakes and shatter) to cores+chunks is 9.5:1. Among the cores there are only one pure blade and pure bladelet core each, but mixed cores (with scars from the removal of flakes and blade[let]s) outnumber plain flake cores by 1.8 to 1. The abundance of microdebitage implies the existence of in situ knapping.

It would seem that all phases of lithic reduction took place at le Trou Magrite during Stratum 2 times, however primary decortication was a relatively unusual activity (at least at the front of the terrace). Much of the non-local flint, in particular, may have been imported to the cave in the form of cores that had often already been decorticated elsewhere (namely at quarry source locations) and especially blanks (blades, large flakes). In reality, however, there are very few (3) cores on clearly non-local flint; most cores are limestone or a black flint that may be of a sort found within the limestone around the cave. So the imported flint essentially seems to have reached le Trou Magrite in the form of mainly decorticated flakes and blades.

Blade technology, while definitely present and well developed, is relatively simple in execution and modestly represented in quantitative terms in Stratum 2. Among the formal, retouched tools, 24% are made on blades, 71% are on flakes and 5% are on chunks.

There are 122 stone tools from Stratum 2 made on 110 blanks; that is to say, there are a dozen tools with multiple retouched edges not accounted for by the composite types listed in the de Sonneville-Bordes/Perrot typology (Figures 4.1-4.2-4.3-4.4).

Nearly one quarter (23%) of the tools are endscrapers notably 14 classified as endscrapers on flakes (plus other types also on flake blanks). There is one thick nosed and atypical keeled endscraper each and one endscraper on an Aurignacian scalariform retouched blade. There is also one Dufour bladelet and among the numerous continuously retouched pieces (29.3%), there are 2 with scalariform, "Aurignacian" retouch. The four perforators equate to 3.2% of the tool assemblage. There is only one burin, an angle burin on a break (0.8%). Yet there are 6 burin spalls. Stratum 2 (like Stratum 3 and many other Belgian assemblages of this age) has fragments of foliate (leaf) points, in this case 2 unifacial points. The rest of the assemblage is rather "Mousterian" in composition: 17 notches and 14 denticulates (25.4%) and 15 sidescrapers (12.3%). There are no backed knives, blades or bladelets, and no truncation burins.

Stratum 2 also yielded two sagaie fragments. One is a mesial segment of a subcircular cross-section point made of antler. The other is a double-bevel (chisel-point) tip fragment (probably basal) of subquadrangular cross-section, either antler or bone. The latter piece is heavily polished; one face is slightly grooved. Neither sagaie fragment has any decoration (other than polishing striae). These are the only organic artifacts from the stratum and, indeed, from the Trench C excavation of 1991-92.

Although classic Aurignacian fossil directors are scarce, Gravettian ones are totally absent. Stratum 2 is assignable in a traditional sense to the Aurignacian on the basis of the presence of keeled and nosed endscraper types, a Dufour bladelet and scalariform retouched blades, and on the absence of backed pieces and truncation burins. This attribution is concordant with the radiocarbon dates centering on 32-30 kya.

STRATUM 3: ARCHEOLOGICAL CONTEXT

It was far more difficult to devine the existence of occupation surfaces in Stratum 3 than in overlying Stratum 2. A major part of the problem is the presence of large and medium size blocks within the cryoclastic composition of Stratum 3, together with the outcropping at this level of numerous huge boulders that had fallen from the cave roof during Stratum 4 times. The inhabitants of the cave entrance in Stratum 3 times encountered and dealt with a ground surface that was "structured" by these boulders. By Stratum 2 times these boulders had been covered over by small eboulis, sandy silt and anthropogenic

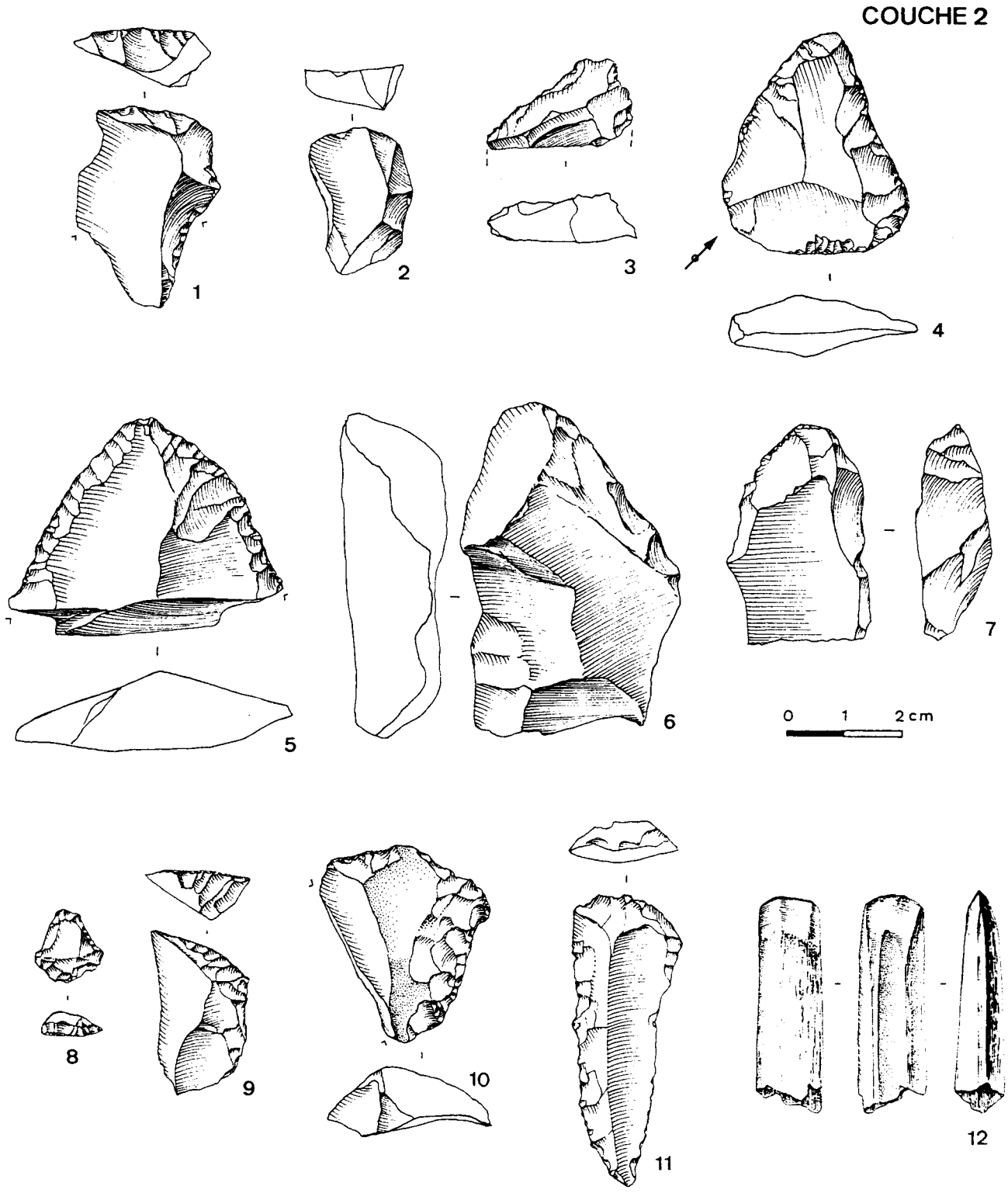

Figure 4.2. Stratum 2 (for details, see captions after References).

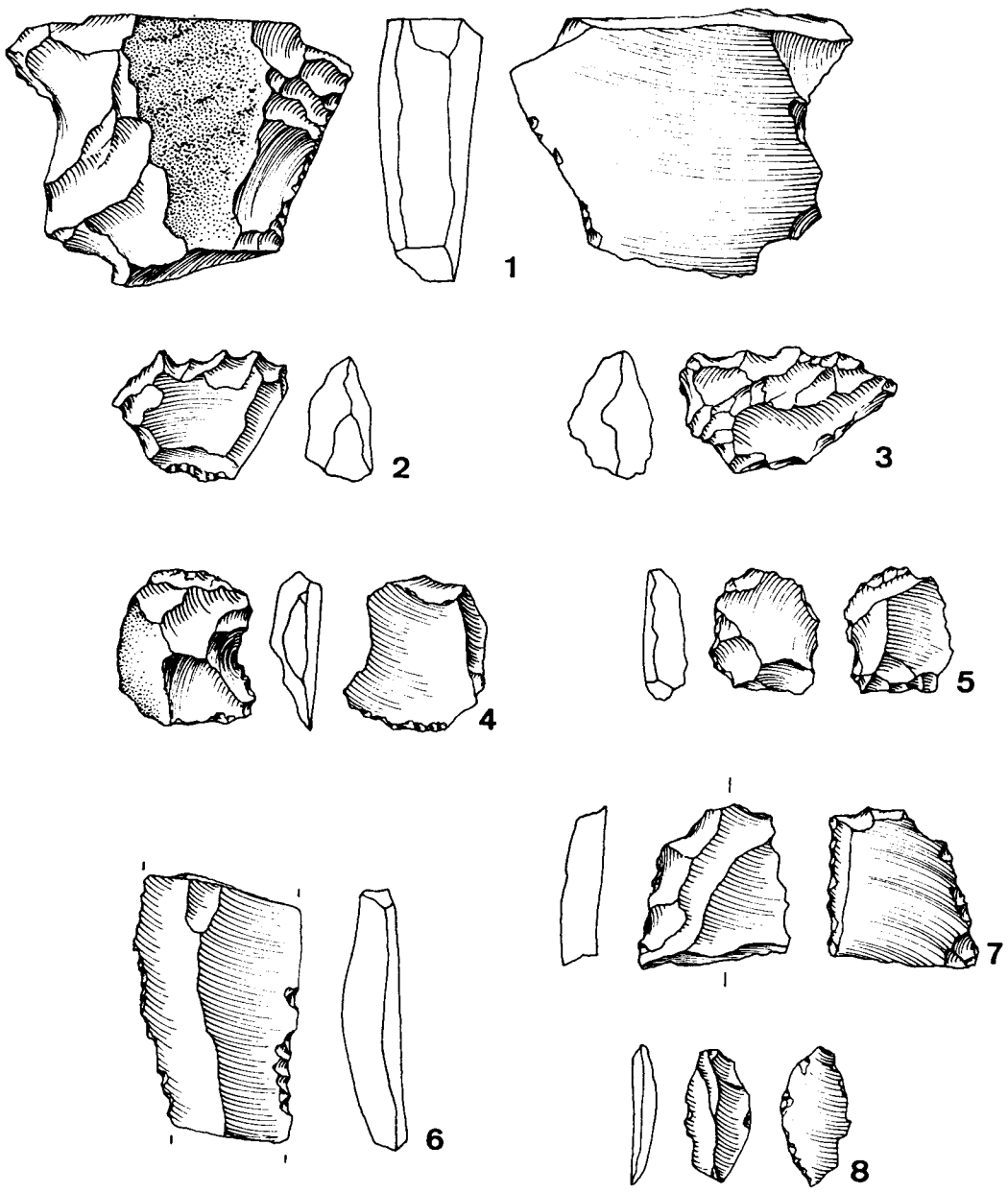

Figure 4.3(a). Stratum 2 (except 7 : stratum 5) (for details, see captions after References).

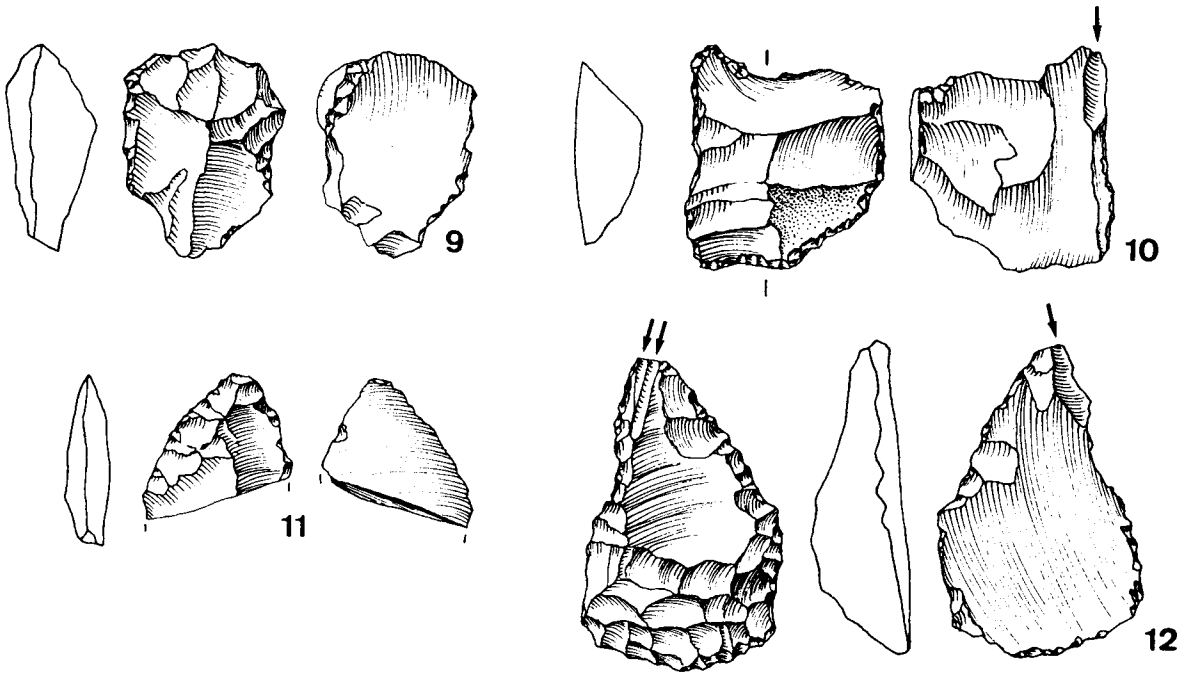

Figure 4.3(b). Stratum 2 (except 10 : stratum 2/3) (for details, see captions after References).

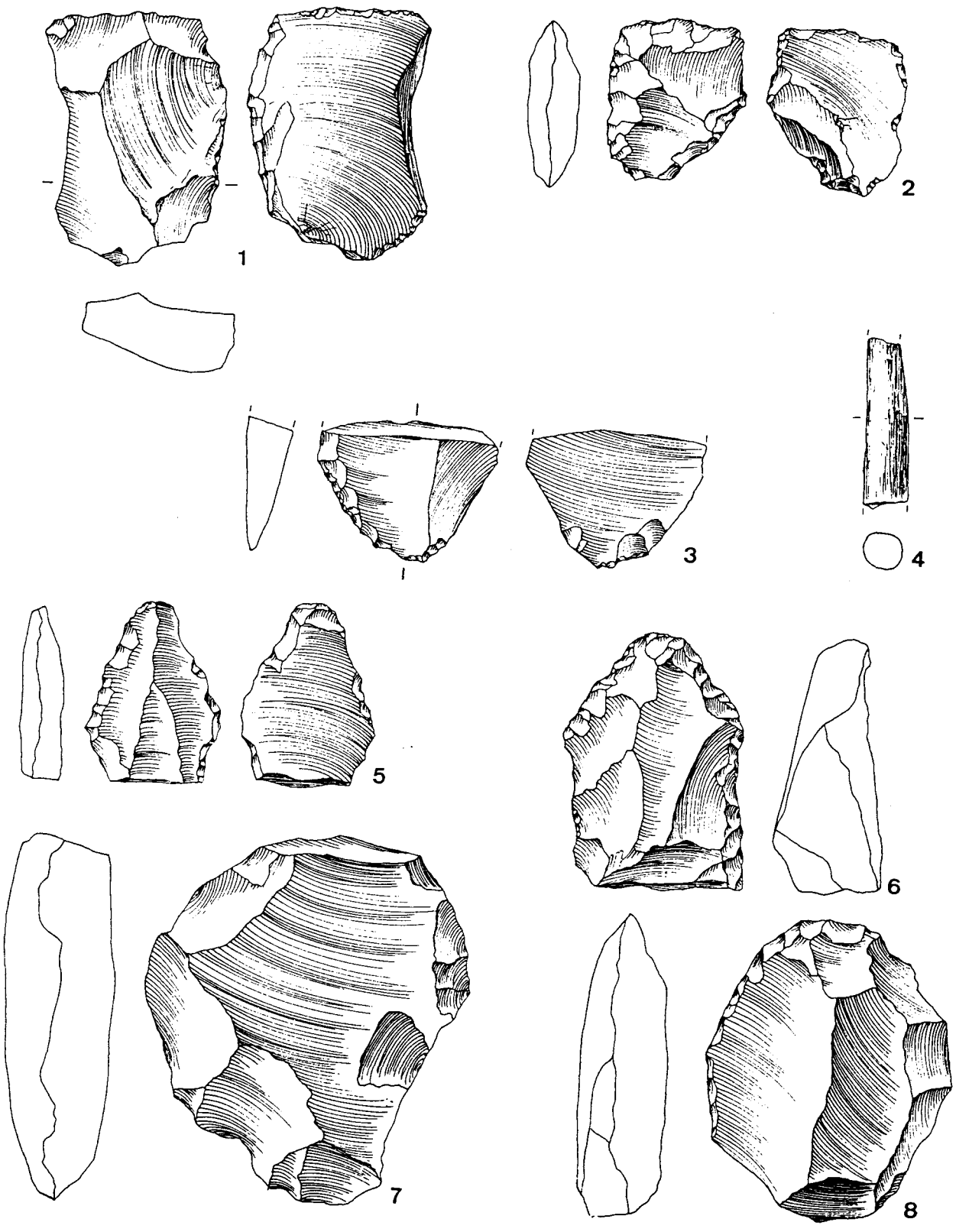

Figure 4.4. Stratum 2 (for details, see captions after References).

residues, leaving a more open, unobstructed surface for human use. The upshot of the block and boulder littered surface in Stratum 3 times was that cultural and faunal remains were per force concentrated in little clusters among the rocks. Although the area of Stratum 3 that we were able to excavate was virtually as large as that of Stratum 2 (i.e., ca. 20 sq.m.), much of the Stratum 3 area consisted of rocks, hence devoid of artifacts and bones. The patches of finds correspond largely to inter-block spaces and crevices. Although some of these patches may indeed correspond to the residues from activity areas, they are no doubt largely the product of structuring imposed by the blocks. And we excavated too small a proportion of the cave entrance area (though it was all that remained to be excavated) to see anthropogenic structuring (i.e., how people potentially made use of the boulders as natural partitions for redundant activity segregation) on a meaningful scale. There is one case of 4 horse teeth from the same jaw that were found together in square I4 evidence of at least local intactness.

Preservation of finds is similar in both Strata 2 and 3, including remarkably good faunal preservation despite the open nature of the eboulis and the shock of frequent rockfall. The ratio of lithic (53,871 gm.) to faunal (3,590 gm.) weight is 15.0 to 1, almost identical to that of Stratum 2 again indicative of heavy human activity at the site. Bones with burning traces (2) and cut marks (6) are relatively common, although 5 gnaw marked bones (plus the presence of a few fox and wolf remains) indicate a continued carnivore role between human occupations. Although the total number of identified faunal remains is less than half that of Stratum 2 (78 versus 206), the percentage of identified remains is the same (3%) in both strata (see Gautier, this volume). There are large quantities of well preserved but triturated bones (probably in part by human processing for marrow and fat extraction). With 2,834 faunal remains, the average weight for Stratum 3 is 1.27 gm. (The average weight for the 11 faunal remains from Stratum 2/3 is 1.6 gm.) The smaller amounts of faunal remains and of artifacts in Stratum 3 are possibly just reflections of the smaller volume of non-block sediments that we could excavate.

CHRONOSTRATIGRAPHIC POSITION

The environmental conditions promoting meteorization of the limestone overhand of the cave mouth must have been broadly similar during Strata 2 and 3 times, but with some differences that led both large blocks and small gravels to be produced during the latter. Conceivably the alternation of freeze and thaw conditions may have been more frequent during Stratum 2 times, causing the high degree of comminution that is seen among the Stratum 2 gravels. This is, however, speculative. In general, climatic conditions seem to have been relatively cold but not very dry. The fauna include marmot, woolly rhino and mammoth (only one remain each), dominant reindeer, followed by horse and ibex (plus solitary chamois and Bos/Bison remains). Again as in Stratum 2, boar is represented (two co-articulating bones), suggesting that it was humid and sheltered enough along the south-facing edge of the Lesse valley for there to be some wooded areas, despite the cold but fluctuating climate. An age late in oxygen isotope stage 3 was predicted on the basis of the early Upper Paleolithic

typology of the stone tools recovered, despite a scarcity of blade technology (see below).

Three radiocarbon dates are available from Stratum 3 (Table 4.3). The total bone gelatin date of 27.9 kya is out of stratigraphic order with the acceptable dates from Stratum 2, but at plus one sigma a date of 31.3 kya is more reasonable and at plus two sigma, 34.7 kya would be completely in line with a basal Stratum 2 age on the order of 32-34 kya. This would seem to be confirmed by a second conventional determination on whole bone gelatin of greater than 33.8 kya for upper Stratum 3. A similar date (33.8+1.7 kya---Lv-1641) has recently been obtained for the lower Aurignacian level (A) at le Trou Walou, 70 km. to the northeast (Dewez 1989). However, middle Stratum 3 at le Trou Magrite yielded an AMS date of 41.3+1.7 kya on bone gelatin. This particular sample was extremely well preserved, with protein content nearly as great as that of modern bone (T.Stafford, personal communication). Chances of contamination seem slight, as the sample came from 20 cm. above the top of Stratum 4. Even at minus 2 standard deviations, this date would place mid Stratum 3 at around 38,000 radiocarbon years, making it one of the oldest Aurignacian deposits in western Europe, on a par with the recently run dates for the sites of El Castillo, L'Arbreda Reclau Viver, and Romani in northern Spain (see Straus 1994, with references).

ARTIFACT ASSEMBLAGES

Stratum 3 produced 119 stone tools (virtually the same number as Stratum 2), but only 2614 knapping debris (almost exactly half the amount as Stratum 2). The ratio of debris to tools is a low 22.0 to 1 (Tables 4.1 & 4.2). There are no osseous artifacts. The tools are made on non-local flints (43% by count, 25% by weight) and local limestones (39.5% by count, 55% by weight), with a number of pieces made on other non-local and local rocks, such as Brussels sandstone and poor-quality black flint respectively. In contrast, the knapping debris are made less on imported flints (31.5% by count, 6% by weight) and much more on locally available limestone (56% by count, 89% by weight) than the tools, demonstrating a clear selectivity for high-quality flint in tool-making. This is also reflected in the heavy use of even cortical flint blanks to make tools. As detailed in Table 4.2, 26% of the lithic debris are trimming flakes and shatter (i.e., chips that are smaller than 1 cm. and evidence of in situ knapping). Nearly 60% of the debris are flakes and only slightly more than 8% are blades (including 2.6% that are bladelets). There is only one crested blade. Cores are also scarce (n=9; 3%) and chunks too are even fewer than in Stratum 2 (5.1% versus 5.8%). However, platform renewal flakes are nearly equal in quantity and proportionally twice as important (0.6%) as those of Stratum 2. Slightly less than 10% each of the tools are made on blades and on angular debris, and the other 81% are on flakes. This is a rather non-laminar industry, despite the clear presence of many Upper Paleolithic tool types.

Only 3.1% of the debris are cortical, but fully 16.5% of the tools are on cortical blanks. The ratio of large debitage (not including trimming flakes and shatter) to cores + chunks is 12.7 to 1. All the indicators (relatively low amounts of microdebitage and cores, low ratio of debris to tools, low ratio of large debitage

to cores) are suggestive of a relatively low importance of in situ knapping in at least the area of Stratum 3 that we were able to excavate. In addition, the slight amounts of cortical debris, crested blades, as well as cores and chunks, all indicate that primary reduction was especially rare here, with tools perhaps manufactured on blanks that had been made elsewhere. Of course, such a conclusion can be only most tentative, given the small fraction of the potential site area that was excavated for Stratum 3. Nonetheless a valid comparison with Stratum 2 certainly can be made since the same area was dug for both units.

Almost one quarter (24.3%) of the 119 formal retouched tools are endscrapers (Table 4.1; Figures 4.5-4.6). Aurignacian types (keeled, thick and thin nosed endscrapers) represent 8.4% of the tool total. Perforators represent 2.5% and burins 4.2%. The 5 burins are all dihedral types, mainly angle burins on breaks. There are 2 burins spalls. Stratum 3 contained one backed blade fragment and one piece with concave truncation each. Continuously retouched pieces (that do not include any with scalariform retouch) amount to 22% of the tools and there is a fragment of a bifacial foliate point. Mousterian tool types are particularly abundant : 44 notches and denticulates (37%), 6 sidescrapers and raclettes (5.1%). There is also a pièce esquillée. There is a balance in Stratum 3 between tool types typical of the Middle and Upper Paleolithic, with no indication that the former are clustered near the base of the stratum or vice versa. There are even fewer clear Aurignacian diagnostic artifacts in Stratum 3 than in Stratum 2, but, despite the presence of the solitary backed and truncated pieces, this assemblage could traditionally be assigned to that techno- complex.

STRATUM 4: ARCHEOLOGICAL CONTEXT

Stratum 4, dug in about 11 sq.m. (including limestone blocks), is significantly different from overlying Strata 3 and 2 both geomorphologically and archeologically. Unlike those units, Stratum 4 is a very thick horizon, possibly formed over a very long period of time during oxygen isotope stage 4, and deposited in part by running water (colluvially redeposited loess) and in part by wind (pure aeolian loess)(see Haesaerts, this volume). The stratum is also characterized by the presence of several huge roof-fall boulders, seriously limiting the inhabitable area at least at the front of the cave (a phenomenon also found by Toussaint a few meters to the east [M.Toussaint, personal communication]). The few artifacts and bones are scattered in the spaces among the boulders throughout the full thickness of Stratum 4 with no significant concentrations or hints of living floors, unlike in the cases of Stratum 3 or especially Stratum 2. If this area of the cave were visited by hominids, it seems to have been rarely. Despite the great thickness of the deposit, a mere 282 faunal remains were found, only 17 (6%) of which were identifiable (see Gautier, this volume). Still, the ratio of lithic (1,884 gm.) to faunal (755 gm.) weight is very low (2.5 to 1), suggesting how slight human tool use/discard activity was in the site at this time. There are 2 bones with carnivore gnaw marks, 2 with cut marks, but none with traces of burning. In Stratum 4 there is a clear tendency for only large, massive faunal remains to have been preserved: average bone weight is 2.7 grams, versus 1.3 gm. for Stratum 3 and 1.0 gm. for Stratum 2. The smaller bones, so abundant in Strata 2 and 3, may

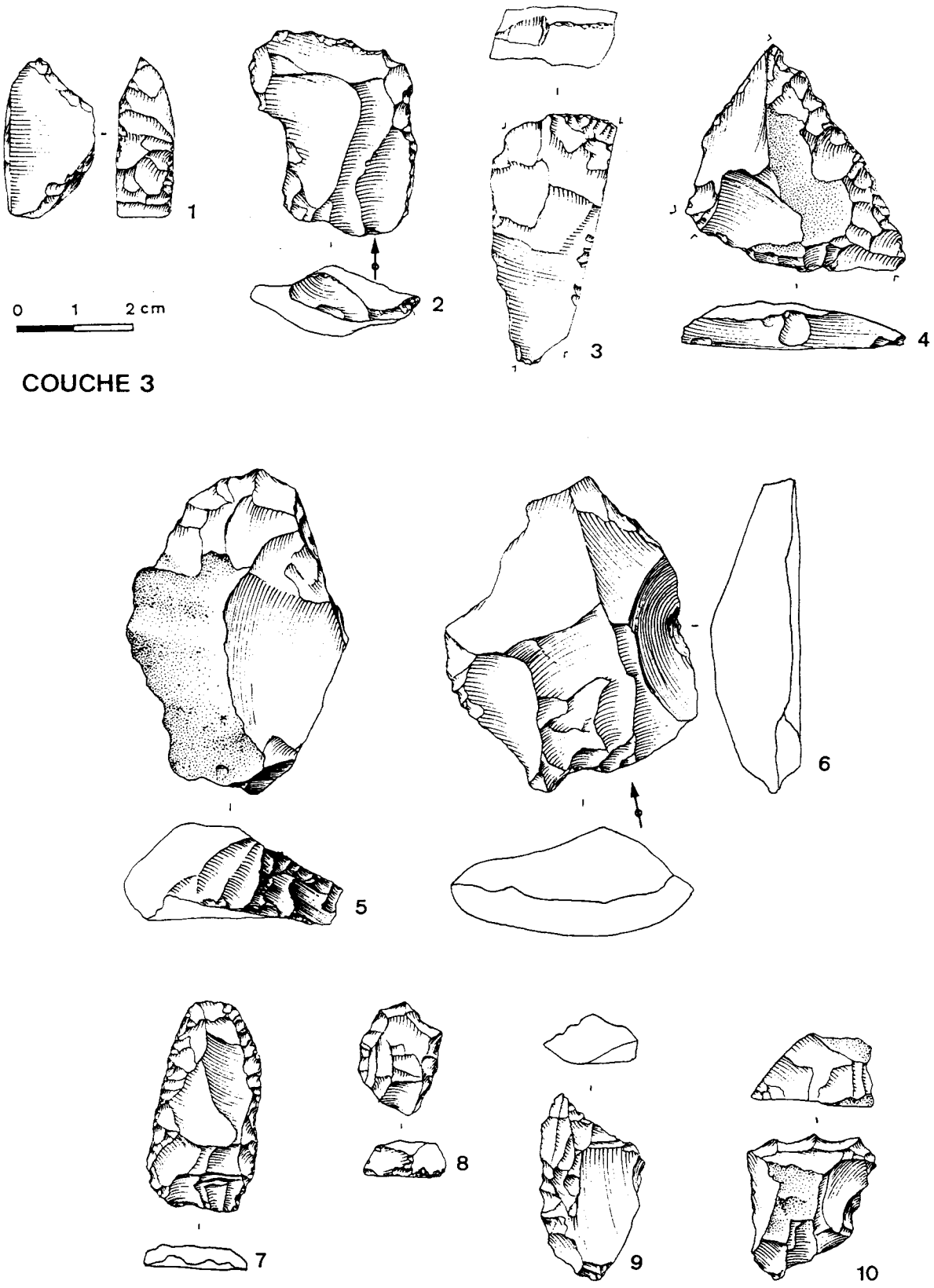

Figure 4.5. Stratum 3 (for details, see captions after References).

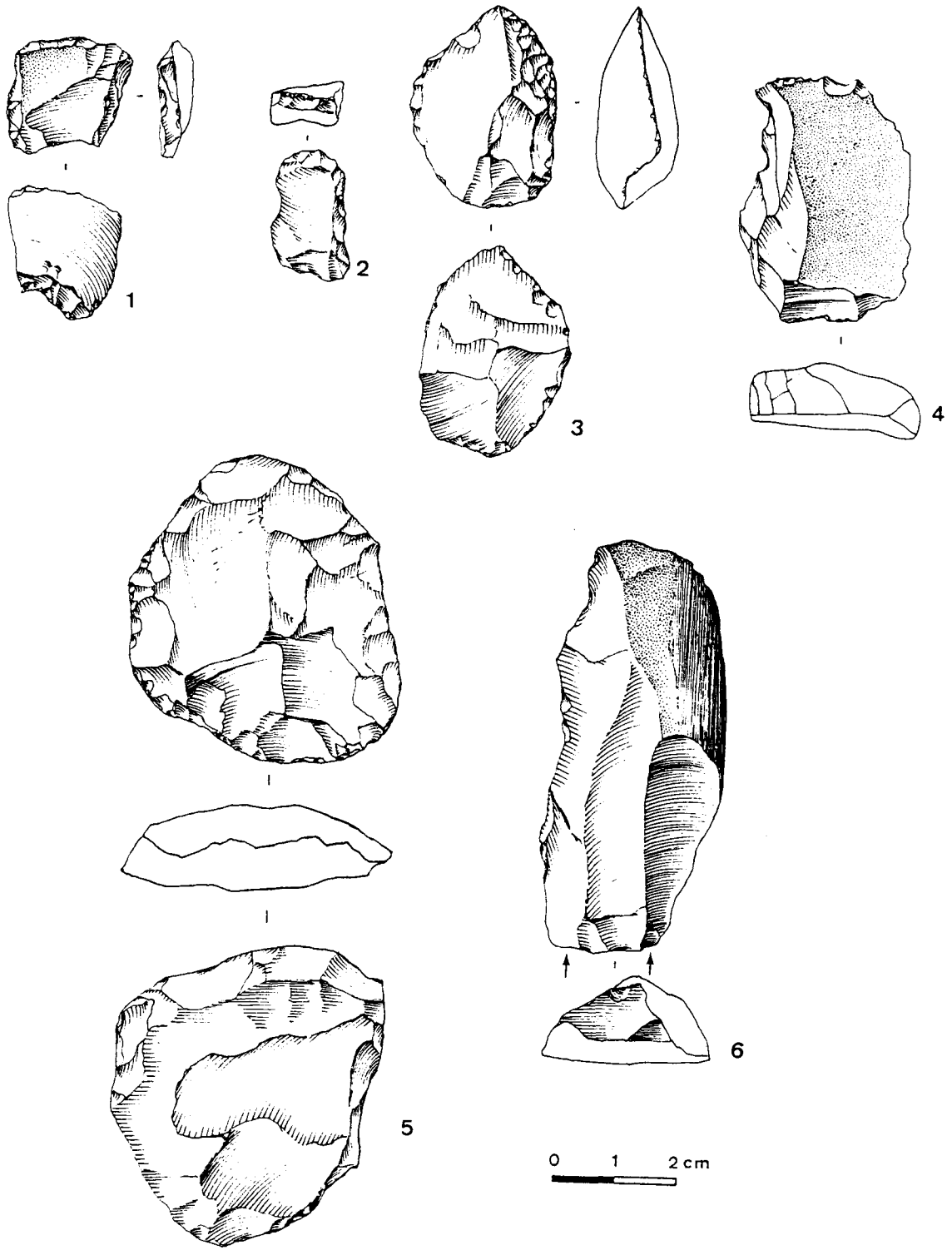

Figure 4.6. Stratum 3 (for details, see captions after References).

simply have been destroyed by soil acids in the loess as well as by alternating wet-dry, freeze-thaw processes. There is some evidence of disturbance and intrusive fauna (i.e., the greater part of an unfossilized badger skeleton found in a burrow).

CHRONOSTRATIGRAPHIC POSITION

Dating of Stratum 4, while most important, is very difficult. Several attempts to obtain radicarbon dates by accelerator mass spectrometry have been unsuccessful, because even the large, dense and solid-looking rhino and mammoth bones selected for dating, proved to preserve inadequate collagen. Although zones of the Stratum 4 loess are cemented by precipitated calcium carbonates, there are no travertines of sufficiently pure quality to attempt uranium-series dating.

P.Haesaerts' (this volume) analyses demonstrate that the loess sediments of Stratum 4 had been alternately deposited by two processes: 4d (top of the stratum) and 4b (lower middle) are the result of aeolian deposition under cold, dry climatic conditions; 4c (upper middle) and 4a (base of the stratum) were colluvially redeposited under more humid conditions. Whether the huge rock falls can be tied to specific climatic conditions is unclear. Clearly, freeze-thaw processes must have cracked the limestone overhang in a fairly massive way, and then either simply gravity or a seismic event may have triggered a vast collapse early in Stratum 4 times. It is likely that conditions included humidity and intense freezing alternating with thawing. Whether these conditions occurred during oxygen isotope stage 3 (Würm Interpleniglacial) or (more likely) late in stage 4 (Würm Lower Pleniglacial) cannot be definitively determined. The fact that the limited faunal assemblage nonetheless includes pika, woolly rhino, mammoth, reindeer and horse, indicates the existence of cold climatic conditions. Either stage 4 or early cold phases of stage 3 are conceivable for the age of Stratum 4.

ARTIFACT ASSEMBLAGES

Only 141 lithic debris were recovered from among the boulders of Stratum 4 (Table 4.2). Non-local, good-quality flint makes up 20% of the debris by count but only 3% by weight (so the flint flakes etc., are obviously quite small). Local limestone makes up 59% by count and 83% by weight. There are also items made on probably local poor-quality black flint and crystal quartz, as well as one item each on non-local phtanite and Brussels sandstone. Three quartzite items could have been procured in the Lesse River bed. With 10 retouched tools, the ratio of debris to tools is an extremely low 14.1 to 1. This gives an impression of little in situ knapping and the importation of tools to the site.

This impression is somewhat supported by the relatively low frequency of microdebitage (18.5%). Flakes equal to or larger than 1 cm. make up 51%. The few blades make up 9.2% of the total debris and there is a single item that can be

classified as a bladelet (<2 cm.).(Total laminar index=10%.) There is only one core (a Levallois flake core, onto which a possible frost spall found nearby could be refitted)(Figure 4.7.1). In addition Stratum 4 yielded one pièce esquillée (which could be a bipolar core remnant). Chunks, however, are relatively abundant (n=26, 18.4%). The ratio of large debitage to chunks(+cores) is 3.3 to 1. This abundance of chunks is hard to explain in light of the scarcity of large debitage and the near absence of cores, facts which also suggest the conduct of little knapping at least in the front area of the cave (which would have been the best lit and most suited to knapping!). There is only one platform renewal flake and there are only 4 items of debitage with cortex (2.8%).

None of the retouched tools is made on non-local flint, although there is a sidescraper that is on a material that may be Brussels sandstone from central Belgium. One notch is on black flint of possibly local origin and one dihedral burin is on chert, also of poor quality. The other tools (including the piece esquillee) are on local hard limestone. As with the debitage, the small number of tools are made on a surprising diversity of raw materials. Two notches and one plane burin are made on blades; the other tools are made on plain flakes and chunks. None of the blanks are cortical.

Five tools were classified according to the de Sonneville- Bordes/Perrot Upper Paleolithic typology (Table 4.1) and 5 others according to the typology of F. Bordes for the Middle Paleolithic (Table 4.4; Figures 4.4.6 & 4.7). There are two burins: a straight dihedral (Figure 4.7.2) and a flat burin. (There are no burin spalls.) Half of the 10 tools are retouched notches. There are two flakes with continuous retouch on one edge and one simple straight sidescraper (Figure 4.4.6). In sum, there is little about this assemblage that would indicate a simple Upper Paleolithic attribution: blades are few, blade cores absent, there is only one truly convincing burin. Mousterian type tools are present, so this could be considered a transitional industry. However the artifacts are too few and too scattered throughout a thick, archeologically undifferentiated deposit to make any kind of definitive determination. There is no evidence that the putative Middle Paleolithic tools were found stratigraphically lower than the "Upper Paleolithic-type" tools or the blades. In fact, the flat and dihedral burins were at 182 and 192 cm. below datum respectively, and the sidescraper was at -190 cm.

STRATUM 5 : ARCHEOLOGICAL CONTEXT

Hominid activity seems to have been even slighter in Stratum 5 times than in Stratum 4 and non-hominid activity was greater. It is also clear that the Trench C zone was inside a covered cave area in Stratum 5 times, rather than at or just outside the dripline as it was in Strata 4, 3 and 2 times, since a major retreat of the overhang occurred with the large scale rockfalls in Strata 5 and 4 times. Stratum 5 silts and sands were largely deposited by running water flowing through an active karstic system. As a result, there may have been only restricted times during which the cave was habitable and it may have been relatively unpleasant.

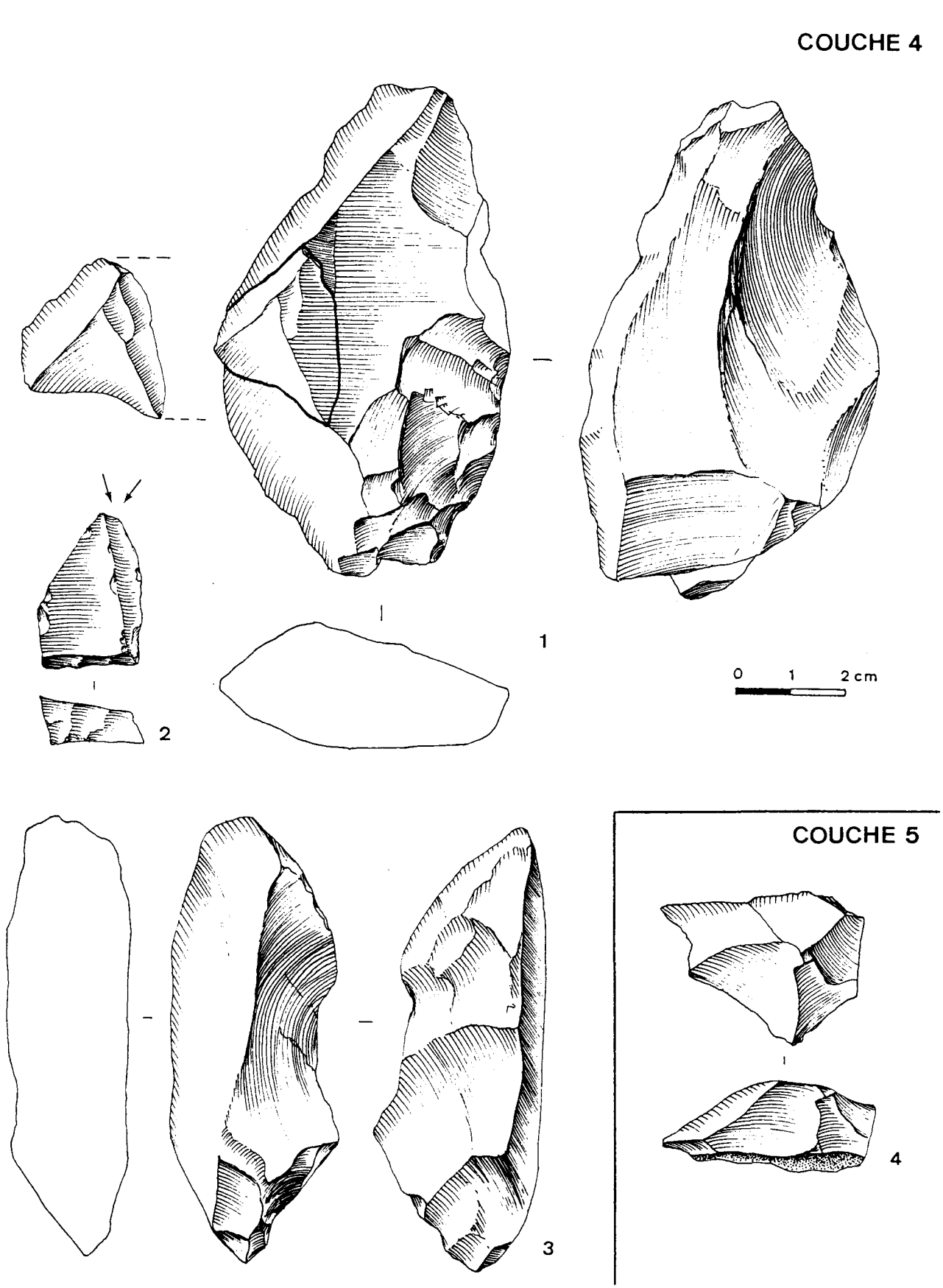

Figure 4.7. 1-3 : Stratum 4; 4 : stratum 5 (for details, see captions after References).

TABLE 4.4.

TROU MAGRITE (1991-1992)

MIDDLE PALEOLITHIC TOOLS

Strata

	4		5	
TYPE	No.	%	No.	%
2			1	14.3
9	1	20.0	2	28.6
33			1	14.3
39			1	14.3
42	4	80.0		
43			2	28.6
TOTAL	5	100.0	7	100.0

MIDDLE PALEOLITHIC TOOLS TYPES

2 Atypical Levallois flakes

9 Sidescrapers, simple, straight

33 Atypical burins

39 Raclettes

42 Notched tools

43 Denticulate tools

Of the 75 identified bones and teeth (3.2%, out of a total of 2,328 large mammal remains), 22 (29.3%) are of carnivores: foxes, cave bears and especially weasels. The foxes include the common and/or arctic species. There are 33 remains of hare (possibly including arctic hare) and 2 of pika. The few identifiable ungulate remains (mainly teeth or very dense bone fragments) are of woolly rhino, horse and reindeer (5 each) and 1 of ibex (see Gautier, this volume). Most of the rest of the faunal remains are obviously tiny, unidentifiable splinters, weighing on average 0.8 gm. the smallest average bone weight for any level at the site. Given the scarcity of evidence of hominid activity, it is likely that many/most of these animals died naturally in the cave or were the prey of carnivores. The rhino, horse and reindeer could be exceptions, although it is possible that their few, isolated remains had washed into the cave from the plateau via the chimney at the rear of le Trou Magrite. Bone surface condition is too poor to judge exact taphonomic processes, but running water and carnivore activity are possibilities. Carnivore gnaw marks are present on at least 4 bones; cut marks and evidence of burning are virtually absent (1 each). The lithic (1,989 gm.) to faunal (1,881 gm.) weight ratio is 1.1 to 1, indicative of the very slight human presence in the site.

The lense of nearly solid rodent bones in the upper middle part of Stratum 5 is clear testimony to the intensive, continuous use of the cave mouth as a roost by owls during part of the time that Stratum 5 was formed. This must have been a time when hominids visited the cave little or not at all. No artifacts were found in the pasty, blotchy white rodent bone lense. This owl regurgitation layer is also clear proof that the cave roof overhang had extended at least this far southwestward toward the talus in Stratum 5 times.

The artifacts in Stratum 5 are extremely few (only 115 altogether) and scattered, with no hint of any occupation surfaces. The artifacts occur singly or in very small "clusters" amidst the blocks that forced reduction of the excavation area to a mere 8 squares (and in reality much less than 8 sq.m. of loess and sand). Many may be in at least slightly secondary position. But one hint of at least local intactness is the existence (in square J8) of two secondary decortication flakes that refit.

The paleontological and archeological materials suggest that hominids were only occasional visitors to le Trou Magrite at this time and that, at least at the front of the cave, these visits were quite ephemeral.

CHRONOSTRATIGRAPHIC POSITION

The macrofauna referred to above are suggestive of cold climatic conditions during the formation of at least parts of Stratum 5. However, the sandy silt matrix was apparently redeposited, washed in by water through the karstic system, implying at least periodic high local humidity (see Haesaerts, this volume). The archeology provides little chronological evidence, since the Mousterian artifacts could date to early oxygen isotope stage 3, stage 4 or stage 5.

AMS radiocarbon dating was attempted on a bone sample, but original protein from bone collagen was essentially absent, so the determination is meaningless.

The microfaunal spectrum from the owl pellet lens in upper middle Stratum 5 provides some interesting clues as to the age of this Stratum. In his careful analysis of the extremely rich rodent assemblage, Cordy (this volume; see also 1992) finds several detailed, unique similarities with the microfauna of Couches Vg/4 in nearby Sclayn Cave. The Sclayn deposit (bracketted by radiometric dates) is assigned to the Melisey II pollen zone of the Grande Pile core in NE France. This pollen zone is well correlated with oxygen isotope stage 5b, dated to ca.95-85 kya. The rodents include a number of cold steppe forms (various lemmings, pika, Nordic vole, etc.). Cordy extrapolates the existence of generally dry, cold, open steppe environments, but with considerable winter snowfall and significant spring snow melt causing runoff and redeposition of fine sediments.

The only hint of semi-credible palynological information on vegetation and environment in the Trou Magrite sequence comes from two samples at the middle of Stratum 5, with pollen sums of 50 and 58 pollens and spores, and 5 and 10 taxa respectively.

Both samples are overwhelmingly dominated by Cyperaceae (sedges) and Pteridophytes (ferns). Despite the local humidity indicated by the ferns, trees are not represented (except for 1 pine pollen) and Poaceae (grasses) are relatively abundant. The presence of 2 pollens of Selaginella (a fern) is indicative of a cold climate (Cl.Schutz, personal communication). Despite all the necessary caveats about small sample sizes, these results seem to confirm the geomorphological and paleontological evidence of a cold, arctic steppe environment, but with local/seasonal humidity during the time of at least mid-Stratum 5 formation.

Underlying Stratum 6 was formed by even more dynamic (at times violent) water flow through the Trou Magrite karstic system, with coarse sands, water-worn gravels, pebbles and very large cobbles. Haesaerts (this volume) believes that these sediments derive from ancient fluvial terrace deposits atop the plateau, and were washed into the cave through the chimney by strong currents. This high humidity could pertain to one of the wetter phases of oxygen isotope stage 5, such as 5e or 5c. As noted above, this deposit is archeologically and paleontologically sterile.

If these interpretations are correct, the base of the Trou Magrite entrance infilling would date back to oxygen isotope stage 5. Then there seems to have been a significant hiatus, but its exact temporal extent and placement are uncertain. Stratum 4, with evidence of a cold climate and at least periodic, local humidity, alternating with dry conditions, might date to oxygen isotope stage 4. It was definitely truncated by a major episode of erosion, followed by precipitation of calcium carbonate that cemented part of the remaining Stratum 4 deposit. Strata 3 and 2 represent a major change in fundamental deposition, from waterlain to cryoclastic. Formed principally by extensive gelivation, these levels represent much colder overall conditions than the underlying strata. Strata 3 and 2 date to late oxygen isotope stage 3. They were later partially cemented with

calcium carbonates precipitated from water percolating from the cave. The rest of the (oxygen isotope stage 2) deposit was eliminated in the 1830's.

ARTIFACT ASSEMBLAGES

Stratum 5 produced only 110 lithic debris and 7 tools. For their small number, the debris are of a surprisingly wide diversity of raw material types. Non-local, good-quality flints make up 22% by count and 4% by weight; local limestones make up 48% and 70% respectively. Poor-quality, black flint (present in the local limestone) and chert (source unknown) make up 28% of the debris by count and 11% by weight. Probably local crystal quartz makes up 6% by count and 5% by weight, with traces of phtanite, fine-grain quartzite and other stones. This same diversity is reflected among the few tools. Only two tools are on non-local flint. Our observations on lithic diversity confirm those of Ulrix-Closet (1975:41) in her study of the large Dupont and other Mousterian collections from the cave.

Among the Stratum 5 debris, 12.7% have some cortex (Table 4.2; Figure 4.7.4). There are only 5 cores (4.5%) and 26 chunks (24%), as well as one platform renewal flake. The ratio of large debitage to cores+ chunks is a low 2.3 to 1. Microdebitage is scarce (7 trimming flakes and shatter=6%). While small chips (and even some of the flakes larger than 1 cm.) may have been disproportionally removed by erosion, the rest of the evidence does tend to suggest some in situ knapping, especially of the local limestone (virtually none of the non-local flint pieces are cortical). The majority (55%) of the debris are large flakes. There are 8 items classified as blades and 2 as bladelets (total laminar index=9%). All the nuclei are flake cores except one classifiable as a bladelet core.

The items classifiable by F.Bordes' Middle Paleolithic typology include an atypical Levallois flake, 2 simple straight sidescrapers, an atypical burin, a raclette and 2 denticulates (Table 4.4; Figure 4.3.7). These tools are made on flakes and large angular debris, but the burin is made on a blade. There are no bifaces or Quina transversal sidescrapers, both so abundant in the old Trou Magrite collections studied by Ulrix- Closet (1975) and which she thinks are evidence of two distinct Mousterian occupations. Note that Ulrix-Closet also found numerous denticulates and raclettes.

Stratum 6, fluviatile deposits, is utterly devoid of biotic remains. The cave became inhabitable (by animals and hominids) only under at least episodically drier conditions after oxygen isotope stage 5e, but Neandertals seem to have been only occasional visitors to the area of the southwestern area of the cave mouth. They clearly were absent during significant periods of time when mammalian carnivores and raptorial birds were the main occupants of le Trou Magrite.

The chronostratigraphy of le Trou Magrite, as constructed from the 1992-93 excavations, is presented in Table 4.5.

TABLE 4. 5 :

SUMMARY OF THE TROU MAGRITE CHRONOSTRATIGRAPHY

Stratum	Industry	Radiocarbon	Microfauna	Sedimentology
1.1 pit	Meso/Neolithic			
(Hiatus due to removal of Gravettian & Magdalenian in A.D. 1830)				
2 3	Aurignacian	34 ± 2 ka 41 ± 2 ka		Ox. isot.stage 3
(Hiatus/erosion in late Oxygen isotope stage 4 or early stage 3)				
4	Mousterian			Ox. isot. stage 4
5 up/mid	Owl/rodent lens		Ox. isot. stage 5b	
5	Mousterian			Ox. isot. stage 5
6	Sterile, fluviatile			Ox. isot. stage 5e

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FIGURES CAPTIONS

Figure 4.1 : Stratum 1.1 : 1. Completely Backed Blade; 2. Multiple Perforator /Bec; 3. Multiple Perforator/Bec; 4. Denticulate; 5. Triangle; 6. Perforator & Piece with Continuous Retouch -1 Edge; 7. Microperforator; 8. Thumbnail Endscraper; 9. Endscraper on Flake; 10. Neolithic Arrowhead; 11. Flake Core; Stratum 2 : 12. Endscraper on Flake; 13. Multiple Perforator/Bec; 14. Bec; 15. Perforator-Endscraper; 16. Microperforator; 17. Unifacial Foliate;

Figure 4.2 : Stratum 2 : 1. Simple Endscraper; 2. Limestone Flake; 3. Sidescraper; 4. Sidescraper; 5. Sidescraper; 6. Limestone Blade; 7. Thick-Nosed Endscraper; 8. Thumbnail Endscraper; 9. Atypical Endscraper; 10. Endscraper on Retouched Flake; 11. Endscraper on Retouched Blade; 12. Sagaie, distal fragment.

Figure 4.3(a) : Stratum 2 : 1. Aurignacian Blade Fragment; 2. Denticulate; 3. Denticulate; 4. Notch and Piece with Continious Retouch - 1 Edge; 5. Thumbnail Endscraper; 6. Denticulate; 7. Raclette (Stratum 5); 8. Dufour Bladelet. 4.3(b) : Stratum 2 : 9. Endscraper on Retouched Blade; 10. Sidescraper (with invasive retouch and possible burin) (Stratum 2/3); 11. Unifacial point; 12. Burin/Endscraper;

Figure 4.4 : Stratum 2 : 1. Denticulate; 2. Piece with Continious Retouch-1 Edge; 3. Piece with Continious Retouch-1 Edge; 4. Mesial Sagaie Fragment; 5. Piece with Continous Retouch-1 Edge; 6. Simple Straight Sidescraper & possible Nosed Endscraper; 7. Limestone Flake Core; 8. Sidescraper.

Figure 4.5 : Stratum 3 : 1. Atypical Carinated Endscraper; 2. Notch and Denticulate; 3. Completely Backed Blade and Sidescraper; 4. Burin - Truncated Piece; 5. Double Endscraper; 6. Flat Nosed/Shouldered Endscraper; 7. Piece with Continuous Retouch-2 Edges, Splintered Piece; 8. Raclette; 9. Concave Truncated Piece; 10. Thick Nosed Endscraper.

Figure 4.6 : Stratum 3 : 1. Piece with Continuous Retouch-1 Edge & Denticulate & Sidescraper; 2. Double Endscraper; 3. Ogival Endscraper; 4. Bec; 5. Biface; 6. Multiple Dihedral Burin.

Figure 4.7 : Stratum 4 : 1. Levallois Core with Refitted Flake; 2. Straight Dihedral Burin; 3. Notch. Stratum 5 : 4. Levallois Flake.