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SYNTHESIS: BOIS LAITERIE'S PLACE IN THE STONE AGE PREHISTORY OF BELGIUM

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Introduction

The interest in conducting an excavation of the small site of Bois Laiterie Cave in the context of the Belgian Magdalenian lies precisely both in its size and in its chrono-cultural attribution. The study of the Belgian Magdalenian is in current ferment with the recent and/or ongoing work of Vermeersch and students at Orp and Kanne, Otte and students at Chaleux and other sites near the Lesse-Meuse confluence, with the theses by Teheux, Charles and Stutz, new excavations at Vaucelles (by Bellier and Cattelain) and at Walou (by Dewez) and re-analysis of Goyet (by Germonpré), as well as recent excavations in immediately adjacent regions of Netherlands (by the University of Leiden group in the Maastricht area, as summarized by Rensink) and France (Roc-la-Tour, excavated by Rozoy). More generally, the question of the Tardiglacial recolonization of northern Europe has stimulated much new research, including extensive (re-) excavation and dating of sites in England (work of Barton, Jacobi, Roberts, Tolan-Smith, *et al.*), NW France (Fagnart) and Germany (Bosinski, Street, Baales, Weniger). Just within the last few years, a large number of radiocarbon dates (many of them high-precision AMS determinations) have been produced on materials associated with Magdalenian artifacts in several cave sites on the edges of the Belgian Ardennes. Twenty dates from 9 sites place the Magdalenian occupation of Belgium within the traditional temporal range of Bölling; in fact the determinations fall between 13,000-12,200 BP (uncalibrated). If only AMS dates on artifacts or cut-marked bones are considered, the range is even narrower: 12,900-12,300 BP (Charles, 1994; Germonpré, 1997). We are, in short looking at a relatively short «moment» in time, perhaps no more than one climatic phase, some 600 years, during which humans, re-extending their range after the southward contraction imposed by the Last Glacial Maximum, re-found and re-learned how to use the environments and resources of the Meuse Basin. The nature and degree of permanency of their re-settlement in Magdalenian times have been the subjects of speculation and research since the phenomenon was first discovered and defined some 130 years ago by Edouard Dupont. Competing models of permanent occupation versus seasonal migration, major versus minor degrees of contact with and dependency on the Magdalenian territory of the Paris Basin, have been put forth since Dupont's day. We now possess a database that is adequate to *begin* to test some of these ideas.

Yet many of the cave sites that have been radiometrically dated recently were excavated long ago (mostly by Dupont in fact). Reexcavation of a few of those sites (notably Chaleux) has provided much valuable information of all sorts (especially paleoenvironmental and faunal), but often from very limited remnant deposits. The recent excavations at open-air

sites in adjacent areas of Middle Belgium, Dutch Limburg and French Ardennes have provided a great wealth of information of lithic technology (and, at Roc-la-Tour, engraved stone slabs similar to those of the Belgian cave sites and the penecontemporaneous German Rhineland sites of Andernach and Gönnersdorf). Yet they are totally lacking in faunal remains and have poor chronological precision. Cave sites are still required, even if the range of activities conducted therein clearly differed from that of the open-air flint quarry-workshop sites of Brabant and Limburg. Among the recently (re-) excavated cave sites, Chaleux and, to a lesser extent, Vaucelles (Blaireaux) and Walou are all fairly large. Little was known about smaller cave sites, since Trou Abri and Trou da Somme had been mainly dug out in the past with little increase in our knowledge. In addition to the larger, possibly residential cave sites and the open-air flint workshop sites, we need smaller, possibly limited-activity cave sites. Bois Laiterie filled this bill.

In addition, small sites are advantageous in that they can be totally excavated, thus obviating the skewing effects of sampling that inevitably come with the partial excavation of large cave sites. With Bois Laiterie we were able to recover essentially the entire lithic and faunal contents of a «place» that had formed a part of the Magdalenian settlement system in Belgium. And because that place has some very definite physical characteristics of both positive and negative character, the nature of its human use could be hypothesized to have been limited. The location dominating a gorge that is a strategic avenue of communication between the Meuse and the Meuse-Sambre interfluve plateau, suggests the importance of game spotting and ambush hunting at Bois Laiterie. But with its north-facing exposure, small area, steeply sloping bedrock floor and draft-producing upper mouth, Bois Laiterie is a dark, cold, uncomfortable cave, suggesting the hypothesis of short-term, limited-function human visits. It is, theoretically, in such sites that archeologists are most likely to obtain a clear «reading» of site function, as contents should be fairly simple and unblurred by the accumulation of residues from many different kinds of occupations. In fact, even if an archeological horizon in such a site is the result of multiple visits, those visits were likely to have been similar in nature and scope and redundant in their basic residue contents. The archeological decipherment of such small, possibly limited-use sites should be more straightforward than that of large, complex sites with their massive palimpsest deposits.

And yet, even in the little cave of Bois Laiterie, with only one Paleolithic horizon, we must confront the problems of palimpsests, disturbance and mixing. All archeological sites lie some-where on a scale of intactness between (rare) Pompeii-like pristineness and total redeposition. We were immediately confronted at Bois Laiterie with slopes (down both west to east and south to north) so steep as to suggest the likelihood of at least local deposit movement of some kind(s).

Site Integrity

The study of site formation/disturbance processes in Bois Laiterie Cave reveals a series of rather perplexing apparent contradictions. Yet these must somehow be dealt with, not only to try to determine whether Bois Laiterie had one or many types and seasons of use, but also

to try to understand its strange faunal assemblages that combine both arctic steppe/tundra taxa and more temperate or humid, woodland-dwelling animals, both large and small. The question is whether that «combination» is the result of mechanical mixture or of azonal Late Glacial ecological mosaic cohabitation (for a North American perspective on the reality of species-by-species «mixtures» of late Pleistocene faunas that defy presentday *community* patterns at continental scale, see FAUNMAP 1996).

On the one hand, most of the Magdalenian lithic artifacts (including very thin, fragile bladelets) have sharp, fresh edges without obvious crushing or rolling damage. Antler and bone artifacts (sagaies, needles) are very well preserved, despite some rodent gnawing on at least one of the sagaies. Large mammal bones are also in good condition and include some fragile elements. Bird and fish remains are also well preserved, indicating the absence of significant sediment movement. Spatial analyses detailed in this book show the existence of distinct activity areas involving at least fire and flint knapping. The fact that they had maintained their spatial integrity despite the cave floor's slopes, suggests the absence of catastrophic solifluction or erosion by running water. The micromorphological analyses by Courty (this volume) also argue against massive slope failure or runoff erosion, although localized movements caused by such processes as human trampling are not ruled out. Importantly, three accelerator radiocarbon determinations (one on an antler sagaie and two on individual bones) from YSS in different parts of the cave and at different depths, yielded statistically identical dates of 12,600 BP. This would suggest that the Magdalenian occupation was a short episode or series of closely-spaced episodes - not a massive palimpsest.

On the other hand, there are inescapable indicators of some disturbance in what at times may have been a rather wet, plastic sedimentary matrix (the sandy silt of Stratum YSS that locally grades into the silty clay of BSC in precisely the area where slab manuports are concentrated). Many of the stone slabs (presumably brought in from the surrounding hillside and top to alleviate the muddiness of the habitable area at the front of the cave) were found lying at steep angles or even vertically - and many of the fragments refit (see Miller and López Bayón, this volume). There are lithic refits across the thickness of YSS and even a few that connect pieces from both YSS and BSC - a combined horizon that reaches 50 cm in thickness at the front of the cave and even greater on the terrace, although much thinner at the rear (where BSC does not exist). This all suggests both movement both vertically within the deposit and some limited «sliding» from the rear toward the exterior terrace - all of which makes sense given the bedrock slopes of the cave floor. The existence of «preferred» orientations of elongated objects lining up against the eastern cave wall, especially at the front of the cave, is also an indicator of at least some movement, as are the steep inclinations of a few items besides stone slabs (*e.g.*, long bones, blades) (see Straus and Martinez, this volume).

Common sense and these facts require us to admit that the site is not «pristine». Nor however does it lie toward the totally redeposited, mixed end of the intactness spectrum. Astonishingly, the scatter of artifacts and faunal remains continues within YSS all the way to the rim of the bedrock ledge in front of the cave. Only where the bedrock plunges nearly vertically (in an old buried cliffline) down to the Burnot stream, does the cultural horizon stop. Although completely exposed to the elements (notably water running down the very steep slope from the hilltop - combined with gravity) outside the cave *per se*, even this sector of the cultural layer survived remarkably intact, with distinct evidence of burning and knapping areas

on the terrace. There must have been very rapid but relatively gentle burial in silt. So the situation at Bois Laiterie cannot be characterized as one of major disturbance. Nor is there *archeological* evidence that the Magdalenian horizon represents a vast amount of time. To the contrary, the refits, the AMS dates, the lithic raw materials (all the same) and the typological characteristics of the assemblage from YSS+BSC all point to homogeneity and to a relatively short period of human use.

Paleoenvironments and Faunas

Bois Laiterie provided a half-dozen sources of information on the environments during, before and/or after Magdalenian occupation: micromorphology, palynology, anthracology, malacology and paleontology of macromammals and of microfauna. Unfortunately, due to the very small size of the site, due (nonetheless) to discordance among the stratigraphies of the cave rear, front and terrace, and due to the different times and locations of sampling for all these analyses (except macromammals, which, of course, came from the whole excavation and not localized samples), there are significant problems of compatibility among the different sources of paleoenvironmental information. The micromorphological analysis (Courty, this volume) tells of cold conditions with intense cryclastic activity during the formation of strata LGS (lower grey sand) and UGS (upper grey sand), which respectively underlie and overlie YSS (yellowish/reddish sandy silt) in the cave interior. These cold periods are tentatively attributed to Dryas I and II respectively. Loess was not being deposited very much at these times. Primary loess was however being deposited in YSS times under somewhat less cold conditions, with especially warmer summers (*i.e.*, more significant seasonality than in the immediately preceding or succeeding periods). YSS sedimentary characteristics are fully consonant with the Bölling age indicated by the three AMS dates. Given that the site is at 50 degrees north latitude, it is not surprising that conditions during Bölling were still relatively cold, albeit less so than those of Dryas I.

It was pollen and wood evidence from the recent re-excavation of the Magdalenian horizon at Chaleux that first (and with great surprise and some disbelief) suggested the relatively moderate nature of Bölling-age environments, with the presence of localized woods or thickets in at least favored microhabitats of the deep Ardennes valleys alongside the continued existence of open steppe-tundra landscapes presumably on the plateaux (Noirel-Schutz, 1994; Schoch, 1994; see also Léotard, 1993, in regard to wood charcoal from the Magdalenian at the nearby small site of Trou Abri). Unfortunately, neither palynology nor anthracology yielded quantitatively impressive results at Bois Laiterie, despite our concerted efforts. Nevertheless, the limited results of both analyses (Emery-Barbier and Pernaud, both in this volume) both show the presence of trees: alder, hazel, juniper, pine and walnut among the pollen; charcoal of birch and alder, plus another tree in the birch family that could be alder or hornbeam. Pollen from the rose family and grasses, as well as fern and horsetail spores, were also found in Stratum YSS. All these taxa are represented among the radiometrically penecontemporaneous pollen and charcoal spectra at Chaleux. The combination of the sedimentological and botanical data paints a very mixed picture for the Bölling, that is no doubt appropriate to the northerly (and still North Sea-less, continental) location of Belgium. It

was still cold and loess was being deposited by the winds, but summers were relatively warm and there was enough local humidity in the valleys of Wallonia to permit the growth of a variety of both coniferous and deciduous trees, including some relatively warm-loving taxa probably confined to sheltered, south-facing slopes. Yet the woodlands had not spread to the plateaux of the Ardennes or Middle Belgium, which were still apparently covered with steppe-tundra vegetation. Because of the relief of Wallonia, the wooded microhabitats would have been adjacent to the open grasslands; humid areas were contiguous with dry expanses. And both types of environments and their respective resources (animal foods from both; fuel and vegetal foods from the gallery woods) were accessible from the Magdalenian sites.

It is in this context that one should not be incredulous at the apparently anomolous co-occurrence of of cold, dry, open steppe-tundra ungulates and others today associated with relatively temperate, often wooded environments. Gautier (this volume) documents the presence in Strata YSS+BSC of reindeer, musk oxen (also present in the radiometrically pene-contemporaneous Magdalenian assemblages found by E. Dupont at Chaleux and Goyet), bison, European wild ass and horse, along with red deer and moose. The first group (and most notably the musk ox) signify the presence of open vegetation and cold, dry conditions, whereas the second group (especially the moose) indicates locally much more humid conditions with woods or thickets. The presence of chamois (also sometimes a woodland-dweller) and especially ibex mainly indicates the existence of steep, rocky slopes. Both arctic and common fox are present in YSS+BSC. Such a faunal mosaic does not seem impossible given the local relief surrounding Bois Laiterie and the other cave sites of Wallonia. Although the glacial faunas were still present in Belgium during Bölling, it appears that the most favorable habitats of the region were being populated by taxa more at home in relatively temperate, humid woodlands. Humans, as part of this northward biotic displacement, preyed on all the ungulates available within a short radius of each site such as Bois Laiterie. Because it overlooks an obligatory passage between the 85 m a.s.l. Meuse canyon floor and the 250 m a.s.l. plateau, this cave was ideally situated for hunters to «sample» species that probably lived contiguously but ecologically separated by vegetation and terrain type in the complex mosaic situation of the Belgian Bölling.

The remaining sources of information on paleoenvironments are microfaunal (terrestrial molluscs, lagomorphs, rodents, insectivores, bats and batrachians). Like pollen, but unlike wood charcoal and large mammal bones, these remains are not primarily in the cave because of human action. Sampling and fine-screening for malaco- and microvertebrate faunas was conducted by Ph. Lacroix in 1995. Unfortunately there are no complete columnar samples from the cave interior, where the sequence of strata was more complete and intact. (However, rodent/ insectivore mandibles and bones were unsystematically collected during excavation of the main sequence within the cave in 1994-5.) The two columns of samples were taken in square W3 on the terrace at the exterior of the cave and in S6 just inside the cave mouth, but upslope of the area of dense Magdalenian deposit. The stratigraphic sequence in W3 starts at the bottom with a possible lens of BSC (reddish-brown silty clay) or RS (red sand) in contact with bedrock, followed by a 60-75 cm thick-Stratum YSS. This is overlain by LBS (light brown silt, rich in calcium carbonates and blocks in the contact zone atop YSS). The sequence in W3 is capped by RC (reddish colluvium). The latter two units gave the impression of slope wash deposits. Although UGS is absent in the cave exterior and its stratigraphic relationship to LBS is unclear, it is noteworthy that there are large blocks directly atop YSS at the base of

UGS within the cave and that there are also large blocks at the top of YSS in the cave exterior, suggesting a generalized roof-fall episode at the close of YSS deposition. Magdalenian artifacts were found in abundance immediately below these blocks in both areas. LBS was laid down later and often has a loose, possibly churned aspect. Such is the case in square S6, where the other malaco/microfaunal columnar samples were taken, and whose results should thus be interpreted with caution in the absence of dates.

Outside the area of main Magdalenian remains concentration at the threshold of the cave mouth atop a precipitous bedrock slope, S6 never yielded much archeological material. The excavators were never certain of stratum designation, labelling the entire sequence down to contact with bedrock «LBS/YSS?» (with the exception of the topmost spit which was called «LBS»). This deposit had the appearance of slopewash. Had the Magdalenian horizon once existed in this spot (the upslope part of the cave mouth), it may have slid downslope 1-2 m to compound the amount of cultural material piled up in T-U6 against the eastern cave wall. In short, the deposit sampled for malaco/microfauna in S6 may have been somewhat mixed (LBS+ YSS?), but probably essentially postdated the Magdalenian occupation (Alleröd?).

Thus the only malaco- and microfaunal samples that were unequivocably associated with the Magdalenian occupation at Bois Laiterie are those from YSS in square W3 (plus the rodent bones collected during archeological excavation by hand-picking from the screens). In terms of microvertebrates, this unit yielded the following information to Cordy and Lacroix (this volume): an abundance of *Dicrostonyx guliemi* and *Microtus gregalis* (both cold, open-vegetation rodents [a lemming and a vole]) and presence of *Ochotona pusilla* (pika: another cold, open-country dweller), together with *Clethrionomys glareolus* (or *C.rutilus*)(bank or ruddy vole: both today woodland dwellers) and *Apodemus sylvaticus-flavicollis* (yellow-necked field mouse: also a woodland taxon). *Microtus oeconomus* (root vole), *M.arvalis-agrestis* (common or short-tailed vole) and *Arvicola terrestris* (ground vole) are also represented in YSS, together with *Sorex areneus-coronatus* (common shrew). All these presently live in humid habitats, sometimes with considerable arboreal cover, the former being the «coldest» in its modern distribution in western Europe (Van den Brink,1971). In short, the YSS micromammals are a mix of open, arctic species and more temperate, humid woodland taxa - like the macromammal fauna from this stratum.

The malacofauna from square W3-Stratum YSS (López Bayón *et al.*, this volume) includes only one strictly woodland-dwelling species (*Discus ruderatus*) and two semi-woodland species (*D. rotundatus* and *Retinella hamonis*). There are also a very few individuals of taxa that prefer humid or even marshy environments, especially at the top of the stratum. On the other hand, there are also a few heliophiles (molluscs preferring open habitats) and (paradoxically also at the top of YSS) a few xerophiles. Mesophiles (taxa tolerant of a wider range of enviroments) are abundant and diverse throughout YSS. These facts again may suggest the existence of mosaic environments during the time of human occupation, with areas of woodland or thickets and local humidity, but close to drier, more open patches, perhaps on the north-facing slope where the cave is located. Indeed, one would expect the low-mobility landsnails to give the «coldest», most open vegetation picture of all the environmental indicators for this Tardiglacial location. Humans may also have denuded the area in front of the cave mouth, creating a more open microhabitat.

Even the bird bones in YSS (Deville and Gautier, this volume) are consonant with a mosaic environment. There are open country grouse and partridge (living on the plateau above the cave), water birds (geese and whimbrel, favoring the Meuse and Burnot stream below the cave), rocky cliff-dwellers around the cave (magpie, jay, passerines), and either a woodland-preferring owl (*Asio otus*) or (and?) an open vegetation one (*A.flammeus*).

In short, all these biological data (botanical and paleontological) paint of picture of very mixed ecological conditions in southern, upland Belgium c. 12,600 radiocarbon years ago. While loess was still being deposited and the plateaux were still vegetated by steppe-tundra plants and the north-facing slope around the cave may have been partly bare, partly covered with low grasses and shrubs, the valley floor and south- and west-facing slopes of the Meuse and Burnot probably harbored not only conifers, but also some deciduous trees and bushes - made possible by higher summer temperatures and local humidity. This set of conditions nonetheless represented a dramatic change vis à vis the much more uniformly open or even barren environments of Dryas I at 50 degrees North. And these conditions made possible the human recolonization of Belgium and NW Europe in general during Bölling in its traditional definition.

Nature of the Human Occupations

Bois Laiterie Cave seems to have seen only one period of actual human habitation: during the Upper Magdalenian. There is no evidence for use of the cave either before or immediately after the episode(s) centered fairly tightly around 12,600 years ago (uncalibrated). Extensive screening of backdirt from the clandestine diggings that had preceded our intervention, revealed only very few lithic and bone artifacts, and most of these can be (by typology and raw material) surely attributed to the Magdalenian. The pothunters had probably cut slightly into the Magdalenian horizon in upslope areas of the cave, where they dug all the way down to bedrock. But their backdirt produced no definite Mesolithic materials, although a variety of ceramics (sub-modern and prehistoric) was found in our screening operation. Sherds are also visible in the side and base of the breccia remnant that adheres to the south and east walls of the cave and that contains human remains. Since this deposit is almost in contact with the cave ceiling, it probably indicates an «ossuary» role for the cave during the Neolithic. This is a well-known regional phenomenon - including an ossuary in Burnot/Juvénat Cave on the slope opposite Bois Laiterie with two C14 dates 4,100 BP (uncalibrated) (Cauwe, 1993; Toussaint and Becker, 1992). The surprise came when a presumed «Neolithic» human foot bone from the base of the breccia (Vandenbruaene and Gautier, this volume) was radiocarbon dated. The result of 9,200 BP (uncalibrated) (see Krueger, this volume) indicates that people had already begun to use Bois Laiterie Cave as a burial site in the early Mesolithic. That such burials were apparently unassociated or unaccompanied by Mesolithic artifacts (be they banal or offeratory) is not surprising, since there are now five other cases of such burials with few or no artifacts dating to 9,100-9,600 BP (uncalibrated) in caves along the upper Meuse and lower Sambre valleys of Namur Province (Toussaint *et al.*, 1996; Cauwe, 1993, with references). The remaining Mesolithic burials from Bois Laiterie (excavated from the breccia after a large block

sense. As outlined earlier (Straus and Orphal, this volume), almost all the chipped stone artifacts are of non-local flint. This high-quality material was probably brought to Bois Laiterie from one of the Upper Cretaceous chalk sources in Middle Belgium - either the Mons-Spiennes area of Hainaut to the west or the closer Orp area in Brabant to the north. The flint was mainly transported in the form of blade blanks; virtually no cores were abandoned at Bois Laiterie and probably very few had been brought there, as there is very little cortical debris either (and almost none of it primary). There are no hammerstones. The artifacts (debris and implements) are almost all very small - also an indicator of transport from a distance. The large number of tiny trimming flakes is an indication of *in situ* transformation of some blanks into tools and weapons - and of resharpening/recycling. The high tool/debris ratio is added evidence that far from the whole lithic reduction sequence took place at Bois Laiterie. To the contrary, this is a place where mainly tertiary reduction and abandonment happened. People arrived here with their light flint blanks and tools, and abandoned a minimum when they moved on to other places. Finally, the tools are a specialized lot: many backed bladelets/small blades, plus several burins and only a few endscrapers and perforators. Together with a few stone points, there are also four magnificent large antler sagaie fragments and other bits of possible sagaies. Since the backed blade(let)s have generally been shown by microwear analysis to have been used as weapon tips or barbs (and there is some support for this here too [see Jardon, this volume]), all these data together support the hypothesis that Bois Laiterie was fundamentally a hunting camp. There is little evidence for much in the way of maintenance activites (*e.g.*, hidescraping, wood-working), although the burins (with some microwear evidence for hard substratum scraping and grooving) may have been used in osseous weapon manufacture or reworking, just as the lithic assemblage composition suggests blank transformation and implement/armature resharpening. That animal carcasses were processed is suggested by the organic residue analyses of a few lithic artifacts (Newman, this volume).

Although spatial analyses (Straus and Martinez, this volume) show the existence of a rudimentary site structure (given the very small useable area of the cave), with burning and flint-knapping areas (in part corresponding to small slab-paved zones) at and in front of the cave mouth and a disposal area at the cave rear, there is no evidence for elaborate organization or substantial investment in infrastructure at Bois Laiterie. The stone slabs are not very numerous and paved only a small surface; they were available strictly locally on the Bois Laiterie hilltop and slopes. None are artistically engraved, as is otherwise the case at Chaleux, Trou du Frontal, Trou da Somme or Roc-la-Tour. There is no evidence (not even a hint) of constructed hearths (fires had simply been built on the ground surface) or other pits. Trash (bones, lithics and even broken sagaies) was simply tossed toward the dark, otherwise perhaps un- or little-used back of the cave (and presumably also down the steep talus in front of the cave). In short, there is no indication of major, long-term, multi-purpose residence at this site.

The macromammalian faunal assemblage (studied by Gautier, this volume) is small, and, unlike that of Chaleux (dominated by horse), is quite diverse: reindeer (MNI=4), horse (3), ibex and muskox (2 each), ass, red deer, moose, chamois and bison (1 MNI each) from combined Strata YSS+BSC. Such an assemblage probably speaks of opportunistic hunting of small numbers of animals during a few repeated visits to the cave, taking advantage of its strategic location on a cliff above the Burnot talweg connecting the Meuse and plateau. Humans not only took equids, bovines and cervids moving up and down that gorge, but also exploited the rocky slopes around the cave itself for caprines. Although none of the large mammals are represented by very large numbers of bones and teeth, the reindeer, horses and ibex (in contrast to the muskoxen and other animals) do have enough remains (including

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Some of the larger water birds may have been prey to humans, also possibly during the warm season according to Deville and Gautier (this volume). Many or most of the smaller birds may have been prey to owls and foxes, both also present at Bois Laiterie. There is no evidence that humans had anything to do with the foxes, which probably used the cave as a den when humans were not there. If so, winter denning by foxes might have been a possibility. However, some of the fish evidence (Van Neer, this volume) suggests (through arguments about fish availability during spawning) that humans were responsible for catching some large fish (brown trout, burbot and grayling) in late winter or early spring. This finding either contradicts the reindeer data or extends the time when there were human visits back to the very end of the cold season or beginning of the warm season. Yet common sense still militates against the notion of humans spending very much, if any, time in Bois Laiterie Cave during winter.

In any event, Bois Laiterie was clearly a limited-use site, which saw one or a few short-term visits by humans during Bölling (and perhaps into the beginning of Dryas II?). Although such occupations were minor both in duration and in numbers of participants (the cave is, after all, tiny, especially in terms of its actually habitable area), some minimal investment was made in providing for a dry, solid living surface by paving a small area with locally available stone slabs. This paved area in the downslope strip at the front of the cave may have supplemented bare bedrock floor upslope (where a few Magdalenian artifacts were found lodged in cracks and cemented to the rock in travertine). But in no case, either in the small cave or on the narrow ledge in front of it, would there have been space for extensive occupations or activities.

The Place of Bois Laiterie Cave in the Belgian Magdalenian System

The Magdalenian of Belgium (and contiguous enclaves of Netherlands and France) is represented by two kinds of sites: 1.) radiocarbon-dated cave sites along the northern (Ourthe-Middle Meuse drainage) and western (Lesse-Upper Meuse drainage) fringes of the Ardennes and 2.) open-air sites on the low plateaux of Middle Belgium and on the high plateaux of the Ardennes. Only two of the open-air sites have been dated (imprecisely, by TL): Orp East (11,800-12,900 years ago) and West (13,100-13,700 years ago) - all with standard deviations between 1,200-1,700 years) (Vermeersch, 1991). (TL dates are likely to be older by nature than 14C dates from the same deposits, as shown at Pincevent and Etiolles, where both methods were used [Valladas, 1994]). The open-air sites fall into two general categories: loci at high-quality flint sources that seem to have been (probably among other things) quarry-workshops (Orp, Kanne, Mesch, Eyserheid, Schweikhuizen and possibly Obourg-Saint Macaire) and a site located at a strategic lookout location at the rim of a cliff dominating the Meuse-Semois confluence (Roc-la-Tour). Arguments (summarized by Rensink, 1993, with references) have been made that most (all?) of these sites were occupied during the traditional Bölling. (Cultural evidence could support either a penecontemporaneous Magdalenian or - less likely - slightly more recent «Creswellian» age for St.Macaire.)

The chronological information for the cave sites are most recently summarized by Charles (1994, with references). The Ourthe cave cluster south of Liège consists of Coléoptère, Sy Verlaine, Font-de-Forêt and Walou. The first site has two conventional and one accelerator radiocarbon date that place the Magdalenian occupation in Bölling (*i.e.*, 13,000-12,200 years ago). The most reliable date (AMS on a cut-marked horse bone) from Verlaine is of early Bölling age. Walou has two conventional dates that, with their standard deviations, straddle the traditional 13,000 years ago Dryas I/Bölling boundary. The Magdalenian cave sites of the Lesse-Meuse confluence area (Chaleux, Trou du Frontal, Trou des Nutons, Trou Magrite, Trou Abri, Trou da Somme and Vaucelles/Blaireaux) are probably all of traditional Bölling age, since all but Magrite and Abri have now produced radiocarbon dates that lie between about 12,900 and 12,300 years ago. (There also are equivocal [in Charles' estimation] indications of late Dryas I visits to Vaucelles - as in the case of Verlaine.) Germonpré (1997) has recently obtained AMS dates of 12,600 and 12,700 years ago on cut-marked musk ox and horse bones in the Dupont collection from Goyet on the Samson, a tributary of the Middle Meuse. The three AMS dates from Bois Laiterie (12,600 years ago) fall squarely within the traditional Bölling time period. The dates from the cave sites suggest a main (or sole) Magdalenian colonization of the Belgian Meuse basin during a period of no more than about 600 years. The problem we face is how to correlate the cave sites with the open-air sites that are *argued* to also be of traditional Bölling age. *Assuming* that the two groups of sites are at least penecontemporaneous (and pertained to the same set of environmental conditions), we may possess (admittedly incomplete) samples from different aspects of a regional settlement system. Even if the open-air sites are not *strictly* contemporaneous with the cave sites (and this could only be demonstrated - albeit within the margin of error imposed by the possibility of stone scavenging by later prehistoric human visitors - by intersite lithic refitting of the sort pioneered by A.Scheer [1993] among 3 Gravettian sites in the Ach Valley of SW Germany), it is easy to imagine that there are/were other such sites either waiting to be discovered or long ago destroyed. What follows is the sketch of a model for an Upper Magdalenian settlement-

subsistence system based on the territory of what is today Belgium, but with contacts both to the south (Paris Basin) and east (Neuwied Basin).

Seasonality evidence from dental cementum analyses of specimens from modern, controlled excavations in Chaleux (ibex), Trou da Somme (ibex or chamois) and Bois Laiterie (reindeer, confirmed by dental eruption/wear sequence analyses) and reindeer (hence *not* Holocene intrusives) from Dupont's excavation in Trou des Nutons indicates (1) winter-early spring *and* summer-fall kills (hence, presumably, human presence) in the upland Lesse-Meuse confluence area along the Ardennes and (2) summer/summer-fall kills around Bois Laiterie at the very northern edge of the uplands near the Sambre-Meuse confluence and the plains of Middle Belgium (Stutz, this volume). Following the logic that people would naturally prefer to take advantage of available shelter (*i.e.*, caves) especially in winter, that game would seek shelter during winter in the protected, well-watered valleys of the Ardennes fringes (rather than on the open, windswept plains of Middle Belgium), and that flint nodules would be difficult or impossible to obtain under the snow or in frozen earth, it can be hypothesized that the open-air Magdalenian sites (both known and as yet undiscovered) of Limburg, Brabant and Hainaut were mainly occupied by people in the warm season (summer-early fall). These places would be repeatedly visited specifically for their abundant, high-quality flint. The aim of flint-knapping activities at such sites as Orp and Kanne was the specialized production of laminar blanks (*e.g.*, Vermeersch and Symens, 1988). Our analyses (Straus and Orphal, this volume) show that precisely those kinds of small blades/bladelets that predominate in the upland cave assemblages of Chaleux and Bois Laiterie are the ones that are underrepresented at Orp and Kanne. This might suggest the selective transport of lightweight blanks from the quarry-workshop sites to the caves. The absolute scarcity of cores, cortical debris, crested blades, hammerstones or other evidence for primary reduction in the cave sites (and, to the contrary, their abundance at the open-air sites) clearly supports an hypothesis of functional (and perhaps seasonal) complementarity between the two *classes* of sites. That flint transport was involved is indicated by the large average size of artifacts at the open-air sites and the very small average size thereof at Chaleux and BL. The general scarcity of backed blade(let)s and points (presumed weapon elements) at the open-air sites is in complementary opposition to their abundance at the cave sites - suggesting that, while some hunting must have been conducted around the open-air sites, it was not the principal activity at the quarry-workshops. In contrast, hunting was very important around the cave sites.

Given its geographic location and physical characteristics, Bois Laiterie might have been a transit camp *en route* between the open-air flint sources of Middle Belgium and the Ardennes. Though its lithic inventory is smaller and somewhat less diverse than that of Chaleux, there are strong similarities between their debris and tool assemblages - perhaps because BL was on the logistical supplyline between the flint sources and Chaleux (or sites like it in the uplands). Given the relatively short distances involved (maximally 63 km from Chaleux to Orp and 80 km from Chaleux to Obourg/Spiennes via the easiest routes - including the Lesse, Meuse, Burnot and Sambre valleys), humans could use the Ardennes caves at times even during the warm season and still go (or send logistical parties) to the flint sources also in summer. Logically, the stricter seasonal constraints would be imposed on human use of the open-air sites, for reasons mentioned above. Presumably better than no shelter at all, Bois Laiterie could have served both as an unspecialized hunting camp during the warm season *and*, if the fish were really caught by people, as a minor site at the very end of the cold season or

beginning of the warm season.

Obviously we need seasonality information from Goyet (which is actually a major series of caves on the border between the hill country and the Hesbaye plateau along the Middle Meuse), from other upland sites in the Ourthe drainage (such as Trou Walou), and (ideally) from open-air loci - if any are eventually found that contain faunal remains. Likewise we need petrographic «fingerprinting» of the flints in order to be able to distinguish with certainty among the very similar Upper Cretaceous flints of the Mons, Hesbaye and Maastricht areas (see Caspar, 1984), a task that so far has defied several serious efforts (P.Vermeersch, pers.comm.). If this could be done, we would be able to determine *where* the people who used different cave sites procured their flints - presumably via either logistical trips and/or as a result of their annual residential moves (see discussion in Rensink, 1993 and 1995). The presumption of direct group visits to source areas is based on the relatively short distances involved. In the case of Bois Laiterie, the presence of pyrite, whose closest known source is in the Mons area (Lozouet and Gautier, this volume), is another indicator of contacts with that flint-rich area, but does not prove the *nature* of the contact. The presence of pieces of pyrite at Chaleux (Otte, 1994) could suggest that BL lay along the route between it and Mons. This brings us to the question of the fossil shells at BL and other pene-contemporaneous Magdalenian cave sites.

Although Dupont (1873) had thought that the Magdalenian inhabitants of the caves in the Upper Meuse and Lesse valleys procured their flints in north-central France, this has been shown to be highly unlikely in the face of much more feasible and parsimonious «Belgian» origins (Teheux 1994). Yet the fossil shells (64 in Chaleux, over a dozen at Frontal, 1 at Dasomme, and unspecified numbers at Goyet - as well as at Verlaine and Coléoptère in the Ourthe drainage [Rensink, 1993]), also important to Dupont's argument, are now joined by 8 at BL (5-6 artificially perforated). Most of these are probably from Eocene deposits in the Paris Basin, although one taxon's closest source is the Loire Basin, even further south. The fact that these shells - clear evidence of direct (visits/intermarriage) or indirect (exchange) contacts between the «Belgian» regional band (perhaps a «daughter» offshoot) and the Parisian area (the location of the pene-contemporaneous or slightly older sites of Pincevent, Verberie and Etiolles) - are only found in the cave sites and not in the open-air sites, is not an argument against possible contemporaneity of the two classes and hence their potential participation in the same settlement-subsistence system. According to P.Vermeersch (pers.comm.), such fossils would likely not have survived in the loess milieux of sites such as Orp and Kanne. On the other hand, the fact that they are found both in major «residential» cave sites such as Chaleux and Goyet and at minor cave sites such as Da Somme and Bois Laiterie, helps to tie these sites together in one territorial system, into which the fossils were introduced as a consequence of social relationships and movements that linked the Belgian and Parisian areas and groups. The *closest* possible geological sources of the Paris Basin fossils are believed to be *no less* than about 150 km from Chaleux. It is one thing to transport small numbers of mostly small fossils (either in long, point-to-point trips or in down-the-line, group-to-group exchanges); it is a different matter to transport significant amounts of lithic raw materials over distances of this magnitude.

On the other hand, there are now known to be Gravettian-age fossils at nearby Goyet (*Polymesoda convexa* and *Granulolabiugm plicatum*) that are probably from Oligocene beds

near Tongres in Belgian Limburg (Lozouet and Gautier, this volume), suggesting connections, at least at that time, between the upland cave area and the flint-rich plains (also the location of the Gravettian site of Huccorgne between Goyet and Tongres). Such connections between caves of the northern Ardennes flanks and quarry-workshop sites in both Belgian and Dutch Limburg (the locations of Kanne, Mesch, Eyserheide and Schweikhuizen) no doubt also existed c.15-12 ky later, in the Magdalenian.

It has been convincingly argued (*e.g.*, Bosinski, 1988; Floss, 1991) that substantial proportions of the flints used in the open-air sites of Gönnersdorf and Andernach at the northern end of the Neuwied Basin of the Middle Rhine came from Upper Cretaceous sources in the region of Maastricht-Liège (eastern end of the Hesbaye), a distance of at least 80 km. The Neuwied sites are radiometrically penecontemporaneous with the Belgian cave sites and most of the Paris Basin sites (Street *et al.*, 1994). While there is no evidence (yet) of contacts between inhabitants of the Belgian cave sites and those of the Neuwied Basin sites, one can formulate the hypothesis that there existed in late Dryas I-Bölling-early Dryas II at least three regional bands in this part of western Europe: Paris Seine-Oise-Basin, Belgian Meuse Basin (perhaps with western and northern subterritories) and Neuwied Rhine Basin. (Other human territorial groups at this time in NW Europe may have included ones in southern and central England, NW and SW Germany, NE France and western Switzerland.) The Belgian group was clearly not an isolate, yet it was separated and distinct from the Paris Basin group (from which it may have split off as ameliorating environmental conditions and increasing food resources made settlement of the Meuse Basin possible). Unlike earlier visions thereof, it is clear that the Magdalenian of Belgium (and NW Europe in general) was not just dependent on specialized reindeer hunting. Although there is some tendency for horse to dominate the fauna of Chaleux, there was clearly a very wide diversity of game in the Bölling-age landscapes. The relief of southern Belgium (however undramatic) provided rich food, lithic and shelter resources. Physical separation of the Belgian territory was apparently «dictated» by the exposed, shelterless, flintless, and then food resource-poor plains of Champagne (Rozoy, 1988), which people must have crossed quickly *en route* to/from the Paris Basin (to maintain social contacts, seek mates, obtain possibly socially and/or symbolically important fossils, etc.).

Thus two types of «traffic» seem to have made up the human landscape of NW Europe.

These were:

I) procurement of non-local flints for tool manufacture either by means of

A) embedding in group movements governed by subsistence activities:

- seasonal or
- non-seasonal, or

B) essentially specialized logistical supply expeditions; and

II) long-distance contacts whereby fossil shells (and presumably other things such as

mates) circulated either by

A) direct visits or

B) down-the-line exchange.

Bois Laiterie helps to prove that there was at least one essentially whole Magdalenian settlement-subsistence system on the territory of Belgium in Bölling times *and* that its group members maintained contacts with the Paris Basin. The Belgian system was apparently self-sufficient in terms of game, fuel, some vegetal food, lithic resources and natural shelters. But demographically this (or these) regional band(s) may have depended on the ability to acquire mates among «adjacent» bands, even if these were at some distance (see Wobst, 1976). They may also have needed an «insurance policy» (*i.e.*, kin or fictive kin to whom they might hope to turn in times of crisis such as a game crash, severe winter, etc., as was done in the ethnohistoric Arctic).

Bois Laiterie Cave, a small, uncomfortable, but usefully situated site, was part of this system. It was a good place to stop *en route* between the flint sources of the plains and the larger residential caves deeper in the hill country. It was a good place from which to hunt local caprines or a variety of other large game often likely to be moving between the Meuse and the inter-Meuse-Sambre plateau. It may have been a good place near which to fish in the Meuse or Burnot stream. Since its qualities were known and since it was at the intersection of two excellent (nearly obligatory) routes between Upper and Middle Belgium, Bois Laiterie may have been visited several times - enough to warrant at least minimal paving to slightly better its uncomfortable living conditions. Lightweight flint blanks were brought to the site; some were transformed into tools and weapons. Antler weapons may also have been fabricated or reworked at the site, possibly using burins. Spent weapons (including broken sagaie bases) were abandoned. But much of the flint may have been taken out by humans as they moved on to their next destination, although some that was left behind may have been reused/resharpened during possible later visits. Animal carcasses or parts thereof were also brought into the cave presumably from nearby killspots. Some may have been consumed *in situ*, but others may have been removed to other (residential) sites. The few endscrapers, perforators and needles testify to the fact that at least some other activities may have been conducted around the simple campfires in Bois Laiterie, such as clothes-making or repair. Meat or hides may have been cut against some of the stone slabs. Perhaps skins were scraped with ochre, traces of which were found on other slabs. And then there are the bored circular stone and the eight fossil shells, most of which are perforated. Why they were abandoned or forgotten at Bois Laiterie, we will never know. Yet they testify to the facts that there were other aspects to the activities conducted at this small cave and that it was in turn part of a wider world. Belgium was on the fringe of that Magdalenian world and community. But it was a vital, viable fringe, thanks to its peculiarly advantageous combination of resources.

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