

THE (RE-) POPULATION OF NORTHERN FRANCE BETWEEN 13,000 AND 8000 BP

J.-G. Rozoy

Translated by L. G. Straus

During the Upper Pleniglacial only southern France was occupied. During the Bölling temperate phase (ca. 13,000-12,200 BP) people of the Magdalenian culture occupied some small (tribal or macro-band) territories ranging from ca. 15,000 to 35,000 km² in area, in zones with substantial relief. The bow and arrow with microlithic tips were invented before the end of Dryas V. Since Allerød times, the whole area of modern-day France was used by Aziloid bow hunting peoples, the boundaries of whose social territories are not yet known. The oblique section bladelet was invented during the Dryas III cold phase. By the end of Preboreal, more than 30 Mesolithic cultures had established themselves and remained stable. During Boreal, tribal territories covered some 15,000 km² each and had populations of 1000-3000 people each - as during the Magdalenian, but without the empty zones among the territories. The microlithic trapeze arrowhead was invented before the Atlantic phase. Changes in industries were thus not caused by climatic changes; rather they were the results of technical inventions. The time lag in terms of inventions achieving their full social effect was on the order of 1000 yr. © 1998 INQUA/Elsevier Science Ltd. All rights reserved

THE STUDY AREA

To the north of the Loire (47°N), from Brittany to Alsace, **the substratum soils and relief are quite varied.** The western end of the loess-covered North European Plain, without much relief or rockshelters, includes Picardy with chalk limestone bedrock, Flanders and Holland with cover sands and silts, and, further east, northern Germany with glacial tilt. To the south of this plain, the Ardennes and Rhineland schist massif are mainly silicious, but contain broad bands of Primary limestones with caves (as in the Belgian valleys of the Lesse, Ourthe, etc.). Sharp relief in this region is due to both continued uplift of the Primary shield rock and river entrenchment, resulting in vertical cliffs of up to 200 m and elevational changes of up to 350 m in only a few kilometers. The plateau slopes and valley floors have a wide variety of exposures, providing for many different biotopes within a relatively small area. To the south of these massifs, from west to east there are series of regions which are rather rolling, but with less relief and lacking in rockshelters and caves: Brittany and the coasts of Normandy and Vendée with granite and schist bedrock; then the Paris Basin with its concentric rings of Secondary and Tertiary substratum (alternately silicious and calcareous -- the latter providing caves at the southern edge of the Basin in Morvan); finally the mainly silicious plains of Lorraine and Vosges Mountains, Alsace, and the silt-covered floodplain of the Rhine. Water is lacking in none of these regions, but flint resources are highly variable: virtually nil in Brittany, on the Ardennes Plateaux, in the Rhineland Massif and in the Vosges (where, in all these cases, however, it can be imported from no more than 100 km away), but abundant elsewhere in limestone bedrock areas (excellent chalk flint, mediocre Dogger and Muschelkalk shales), in alluvia (cobbles in the bedlands of the Meuse, Moselle and Rhine) or in moraine deposits. Quartzites and sandstones can serve as substitutes for flint where it is absent or rare. The southern half of France contains major mountain chains (Massif Central, Pyrenees and Alps), plains (such as the Aquitaine Basin) and broad limestone regions rich in karstic caves.

In short, its environmental diversity is no less great than in the north.

SUCCESSIVE PALEOENVIRONMENTS OF THE PLEISTOCENE-HOLOCENE TRANSITION

After the Last Glacial Maximum, variations in temperature and humidity, which are the determinant factors for terrestrial plant and animal life, brought about **a great variety of floral and faunal spectra and ecological habitats over the course of time** : from virtually abiotic polar desert, to cold steppe with reindeer and horse, to closed temperate forest with deer and boar. With the exception of regions with very special lithology (sands or chalk, which are both peculiarly infertile), the main vegetation types in any given climatic phase can be more or less the same all over this extensive macroregion of Europe and the fauna can be even more so. The latter was the critical element for hunters, since food can always be carried. **This uniformity of food resources over a broad area at any given time** is a fundamental fact, to which the only significant exception is provided by the Atlantic coast, which would have provided supplementary food resources. But we are ignorant of the coasts which existed during the terminal Pleistocene and initial Holocene, since they have been inundated by postglacial sea level rise. We can only get an indirect idea of what the coastal situation may have been like from the Atlantic period (sea level at -10 m), with shell middens at only a short distance from the ancient shore. The use of many marine resources assumes a capacity for deep sea fishing, something that is unlikely for the periods in question here. It also presupposes the existence of storage, for which we have no certain archeological proof.

During the **Bölling** warming phase, hunters lived in a cold, dry steppe with graminaceae (grasses), **Carex** (sedges), compositae and rare, cold-tolerant trees (birch and willow), but not a tundra (which would have existed further north near the margins of the retreating continental glacier). Depending on the different climatic subphases, reindeer or horse was dominant, accompanied by aurochs, bison, saiga, ibex, arctic fox and arctic hare, etc. (Bridault, 1994). Favorable microhabitats, such as that around the Magdalenian site of Chaleux in the Lesse River valley of southern Belgium (Noirel-Schutz, 1990) already have the appearance of thermophile trees (alder, oak, hazel, maple and even beech - for an arboreal pollen total of > 40%). Joining the above mentioned 'cold' mammals (which remained dominant) at this time were various temperate species: red and roe deer and boar, as well as such birds as the capercaillie and the fieldfare.

In **Dryas II**, temperate trees and animals disappeared from northern France; the Ardennes Plateaux were once again barren lands without game where soil wedges were formed as results of either frost or drought. Humans of the cold steppe in the southern Paris Basin travelled further south in summer to Morvan rather than to the Ardennes, which was unoccupied (Rozoy, 1988a, 1992b; Charles, 1994).

In **Alleröd**, the whole of northern France was covered with open forest, dominated sometimes by pine, sometimes by birch, both associated with alder, poplar, hazel or linden (Leroi-Gourhan, 1994). Reindeer and other cold steppe animals retreated further north, while horse and bovines were still present (Baales, 1994). Red and roe deer, boar and beaver were now major complements to the horse and bovines typical of the Last Glacial, and biomass must have actually increased (Elton, 1950; Rozoy, 1978 (pp. 1064-1065)). It is thus wrong to consider the warming as 'an ecological disaster' (Bar-Yosef, 1992; Bosinski, 1990 (p. 260)).

The final cooling episode, **Dryas III**, saw a return of cold steppe and reindeer in Belgium, where this cervid is dominant in the cave of Remouchamps (Dupont, 1872; Dewez, 1987). Faunal data are missing for the Paris Basin. But reindeer did not return to the south of Germany (Cziesla, 1992).

The Holocene began with the **Preboreal**, characterized here by open pine-birch forest with some mixed oak thickets. Large to medium-size mammals included not only boar, red and roe deer and beaver, but also aurochs, horse and rare moose. In the climatic optimum of the Boreal phase, there was massive development of hazel, but the fauna remained the same. As in the Preboreal, boar, favored by the existence of clearings, was more abundant than red deer (Rozoy, 1978 (pp. vi, 328, 1057)). Aurochs is still present, as at Roche-aux-Faucons (Cordy, 1976). During the **Atlantic** period, which was more humid, a darker, more closed, dense mixed oak forest spread throughout these regions, and was composed of as wide a variety of taxa as is presently the case (oak, linden, elm, various species of maple, alder, chestnut, hornbeam, birch, hazel, alder, poplar, mountain alder, wild cherry, service tree, two eiders, black alder, hawthorn, holly, juniper, and finally in this period, beech). But the main animals are still the same (red and roe deer, boar, beaver) and neither aurochs nor horse had completely disappeared (Dewez and Cordy, 1983), although red deer, an animal preferring copses, is now more abundant than boar.

In all periods, salmon ascended the rivers of these regions in Spring to spawn. They, along with other fish, could have provided a very important part (25 -75%) of human subsistence, especially at our latitudes (47-50°IN) (Lee, 1968; Rozoy, 1978 (p. 1061)). However we are still not well informed as to the real significance of fishing in human diets in the periods dealt with here, although we know that it did occur.

CHANGES IN THE LITHIC INDUSTRIES: CAUSES AND MECHANISMS

The succession of industries and cultures in northern France and Northwest Europe is well-known (Fagnart, 1992, 1993). Their **correspondence with climatic episodes is only global in nature** : in the Bölling and Dryas v we have Upper Magdalenian (and in the Northwest the Creswellian, in the Northeast the Hamburgian); in Alleröd the various Azilioid or **Federmesser** cultures; in Dryas III the Ahrensburgian and Malaurie Point cultures. In early Preboreal there are industries with battered blades; and at the end of Preboreal various early Mesolithic cultures. During the Boreal we have defined several middle Mesolithic cultures and during the Atlantic there developed late and terminal Mesolithic cultures and then the Neolithic, with evidence of local acculturation.

B.P.	Climate	Culture	Tools	Inventions
6000	Atlantic	Neolithic		(Adaptation to Neolithic)
		Late Epipalaeolithic	Inverse flat retouch	
7000	Boreal	Recent Epipalaeolithic		Montbani debitage
		Middle Epipalaeolithic		Trapezes
8000	Preboreal	Old Epipalaeolithic		Mistletoe leaves Scalene triangles Tardenois points
		Evolved Azilian and (or) Ahrensburgian		Isosceles triangles Simple points
9000	Dryas III			Micro-Malaurie points
		Azilian Federmesser		Tanged points Bladelets truncating
10,000	Bolling			Backed points
		Magdalenian		Bow Microlithic points Spearthrower
11,000				
12,000				

TABLE 1. The three changes in Epipalaeolithic ('Mesolithic') industries

Note: All three inventions began before the increase in the temperature which they have been said to be derived from: microlithism began in Dryas II in various shapes (Magdaleni- in VI Azilian points, Couze station microliths, Valorguian spindle points, as.o.); bladelet truncating appeared in the Ahrensburgian as soon as the beginning of Dryas III and typical trapezes around 7800 (uncalibrated) everywhere in Europe.

The existence of the **general** climate phase - cultural period **correlation** led archaeologists to think for a long time that changes in industry had been caused by changes in climate. Those who proposed this postulate did not even try to prove it (and with good reason). Indeed, this false 'good idea' has repeatedly been shown to be contradicted by the facts. Many demonstrations as to the error of this postulate have been made for the Lower Paleolithic (e.g., Chavaillon et al., 1978), for the Middle Paleolithic (e.g., Laville, 1977

(p. 136)), for the Upper Paleolithic (de Sonneville-Bordes, 1966 (p. 30); Laville, 1977 (pp. 131-137); Le Tensorer, 1977 (p. 137)) and for the transition to postglacial times (Leroi-Gourhan and Renault-Miskovsky, 1977 (p. 45); Straus, 1992; Street, 1994)). Bar-Yosef (1992 (p. 183)) shows that 'it is social organization that is responsible for the failure or success of the survival of a society that must confront a rapid ecological deterioration provoked by atmospheric agents; the Inuit (hunters) having, with a simpler, more flexible social structure ... overcome the vicissitudes of the Little Ice Age' which nonetheless had destroyed the Scandinavian agro-pastoral colonization effort on Greenland. In what concerns us here, the three essential technical changes of the Pleistocene-Holocene transition time range (the bow requiring light projectiles, oblique truncation of bladelets producing 'geometric microliths', Montbani retouch with typical trapezes) all began **before** the climatic inflections that had been thought to cause them (Rozoy, 1978 (p. 1189); 1989b, 1993b, 1994b) (Table 1). This myth of climate change as the sole supposed cause for changes in industries would have humans merely imitate the animals. It is a holdover from mechanistic positivism; its persistence in prehistory is serious because it minimizes or bides the role of the real mechanism for cultural change.

This real mechanism is **invention under permanent pressure from the environment** (Rozoy, 1994b). Chavaillon et al. (1978) established that, for the 1.5 my of the Lower Paleolithic, 'the first changes concerned technical equipment, and changes in the lifeways came later'. This is also true for the beginning of the Epipaleolithic with the delayed effect of the bow on social life (Rozoy, 1978 (p. 1189)) and, according to J-P. Fagnart (1993), there are technical characteristics for the same period that suggest first the appearance of the types of points required by the bow in Northwest France and only several centuries later, the related technical changes in **débitage**. Such a technical change is confirmed in the Paris Basin by Bodu et al. (1994b): already in Allerød the **débitage** was geared to the production of small blades and bladelets (necessary, as we have shown, for the manufacture of light weapon tips). In addition, in the Lower Paleolithic as in the Epipaleolithic, 'the (chronological) limits of transitions are difficult to determine and vary depending on which criteria one chooses' (Chavaillon et al., 1978). That is to say there is a continuum of mosaic evolution, with many technical inventions being, on the one hand, independent of one another and of the environment on the other hand. To this temporal mosaic we added a spatial mosaic in the Epipaleolithic (Rozoy, 1992a), with changes being progressive, correlative and independent (Rozoy, 1978 (pp. 918-920), 1994b).

THE UPPER MAGDALENIAN

After the void of the Upper Pleniglacial during which only southern France was inhabited, the Upper Magdalenian population during Bölling and Dryas was concentrated in northern France and Belgium only in the two areas shown in Fig. I A; one to the southeast of Paris (27 sites) and the other in the Ardennes (14 sites). These two **occupied zones** (Rozoy, 1988a, 1992c (= 'habitual territory' according to Taborin, 1992) (= 'inhabited space' according to Audouze, 1992)) totalled some 13,000km². These zones were frequented by bands belonging to the same regional group estimated to include about 1000 people, which left behind, here and there, lithic residues of similar types and quantities (Rozoy, 1988b, 1994c). The sizes of the bands are estimated, on the basis of site dimensions, contents and subsistence evidence, to have been between about 50--80 people, including children (Rozoy, 1992b, c). The absence of Marlemont flint at Roc-la-Tour I, the presence of Charleroi-area fossils and Ottignies phthanite in the sites of the Lesse Valley show that the Belgian Magdalenian group acquired their flint in Belgium, which presumes relatively long stays in that territory. However the Ardennes seems to have been occupied only in summer during Bölling (Patou, 1992; Rozoy, 1994c; **contra** Straus and Otte, 1995), probably by one or two bands, whose main site, Chaleux, was favored by an exceptionally benign micro-climate (Inoireschutz, 1990). The inhabited area of the Paris-Belgium group was about 15,000km², as found elsewhere (Rozoy, 1992c) and probably a constant. In the **visited zones** (= 'occasional territory' of Taborin, 1992 = 'traversed space' of Audouze, 1992), there are isolated sites some 50-100 km from one another that must represent occasional visits that were either repeated (e.g., St. Mihiel (Thevenin, 1976), Verberie (Audouze et al., 1981), Gouy (Martin and Martin, 1984)) or single various small sites in Normandy (Fosse, 1994). Taborin (1993) shows that shells used as ornaments were sometimes transported over very great distances (as much as 400 km), necessarily as a result of human movements, since there are large empty spaces among occupied territories. In this case we are dealing with phenomena 'outside the realm of economic space', and within the domain of 'social space, that of alliance networks'.

These two occupied zones included sites established on very different substrata (limestone, schist, sands and sandstone, alluvia), but they are always in **areas of significant relief** - as is also the case even with some of the isolated sites (St. Mihiel, Gouy). The relief is especially marked in the Ardennes; it is notable in the Loing valley, with marked differences in substratum (sands, alluvia, calcareous plateaux); it is

slight in the Seine Valley, where nonetheless it has been noted (Méloy, 1983) that at Etiolles an abundance of braided channels of the Seine caused the creation of a wide variety of microhabitats at the foot of the slope where the site is located. In the German Rhineland, also a region of relatively marked relief, another social group, that of Gönnersdorf and Andernach (Rozoy, 1989a), seems to have alternated its visits with a life based in another, very different calcareous, hilly region, that of the Swabian Jura in southwest Germany. **The factor that determined the choice of settlement areas seems to have been the diversity of easily accessible biotopes**, as was also the case in the 'classic' Magdalenian regions of the Périgord, the Pyrenees, Vasco-Cantabria, Massif Central, Jura, etc. This facilitated the driving of herd animals into culs-de-sac in order to slaughter them (Straus, 1993), a fact which is related to a technique of hunting in large groups with use of the atlatl and dart and which explains the existence of large empty regions of low relief (less favorable to such a kind of big game hunting by drives). Another significant topographic factor is the existence of rivers with fords where reindeer crossed and could easily be killed (e.g., at Pincevent, Etiolles, Marsangy and Verberie - as at many Périgord sites and at the Pastou sites in Les Landes (Audouze and Enloe, 1994; Straus, 1993)). Brittany, lacking in flint, does not even seem to have been visited in the Magdalenian; this is also the case of Lorraine, where the flints are very mediocre. In contrast to the Mesolithic bowmen who knew how to use even the worst shales, the Magdalenians do not seem to have been able to live without good flint. But even that was not enough: the Champagne region, rich in chalk flint, but lacking in rockshelters and in ecological diversity and with poor soils that were probably only lightly vegetated in Tardiglacial times, was not visited, although it was **crossed** - probably as quickly as possible from fear of snow or dust storms. Curiously, the Magdalenians, generally very interested in fossils, did not even stop to collect the fossil urchins that are easily found in Champagne. The flat lands of Middle Belgium north of the Ardennes were used by a different group, the one of Gönnersdorf-Andernach, who came to procure Maastrichtian flint - a type apparently not used by the Ardennes Magdalenian group, a fact which proves the restriction of the latter to the hill country. One can recognize in the Upper Magdalenian (Julien, 1989) base camps, extraction sites, transit sites, etc., in conformity to the now-classic ethnographic scheme for hunter-gatherer spatio-functional organization. But the very existence of aggregation sites is now questioned by one of its early promoters (Conkey, 1992), since the large sites are simply palimpsests of superimposed small and medium-size ones, resulting from repeated returns to the same places during the course of the annual cycle of hunting bands within their territories (Taborin, 1994). There are both broad empty zones among social (tribal?) territories that were only crossed **and** small empty areas **within** the occupied zones (Rozoy, 1992b)(Fig. 7). But the unity of the Magdalenian culture, with the long-distance circulation of fossil and contemporary shells, art objects and styles, and of technical inventions, all show that contacts among regional (tribal?) groups were fairly frequent and that members could understand one another fairly well. Maybe the Magdalenian corresponded to a language family, whereas the Creswellian to the Northwest and the Hamburgian to the Northeast could have corresponded to one or two other language families (perhaps derived from that of the Magdalenian) - but all this is highly speculative at present. At the very end of the Magdalenian, at the site of Marsangy in the Paris Basin (Schmider, 1994), the hunters killed reindeer (which are the dominant game here) with backed or shouldered points that are respectively already of Azilian or Hamburgian style. The dimensions of these points and their average weight (3.66 g for the shouldered points) fit clearly within the range of microliths - proof that the beginnings of microliths and the (re-) invention of the bow took place **before** the end of the cold conditions. 'This invention of the savages is one of the triumphs of the human spirit' (Wilson, 1900).

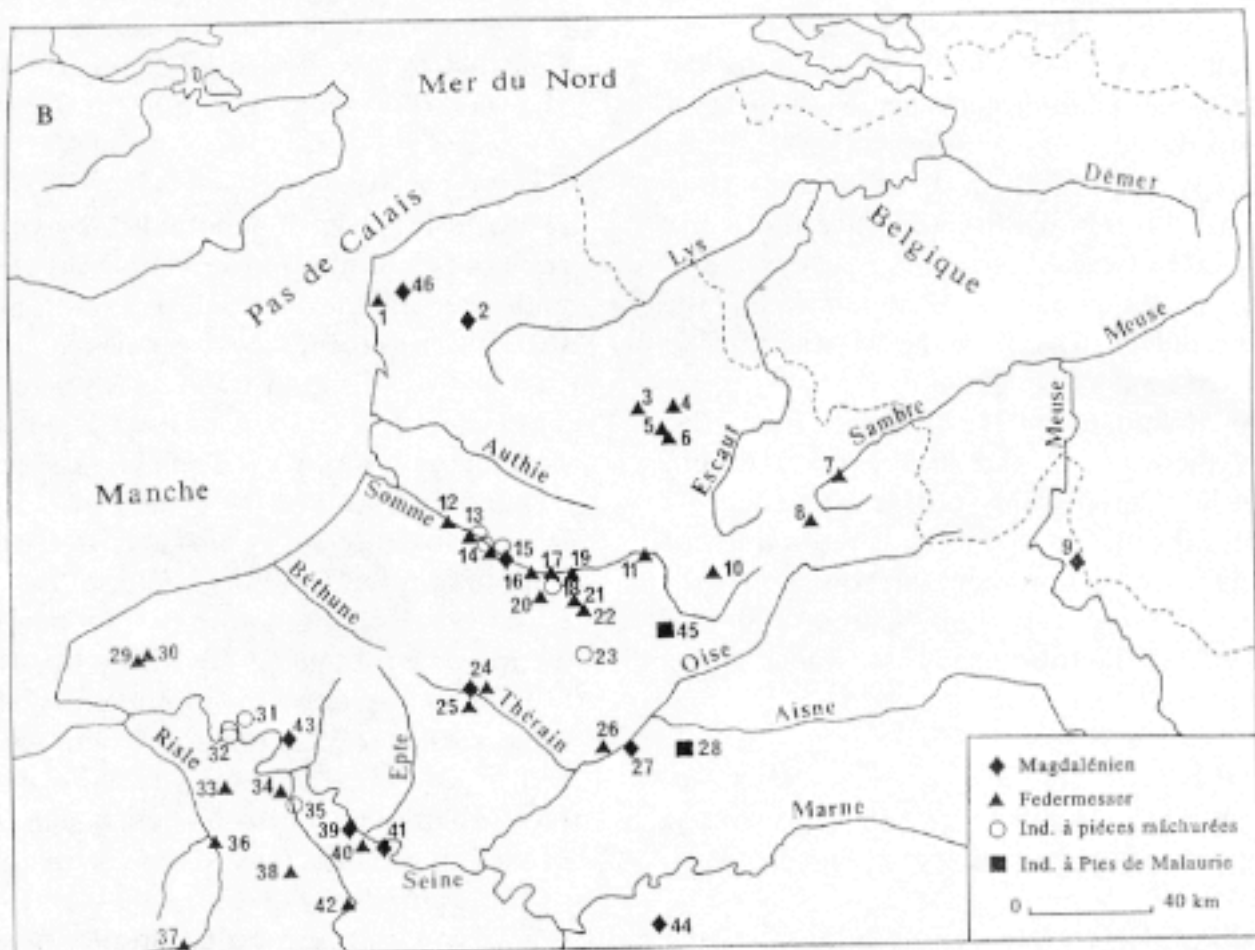
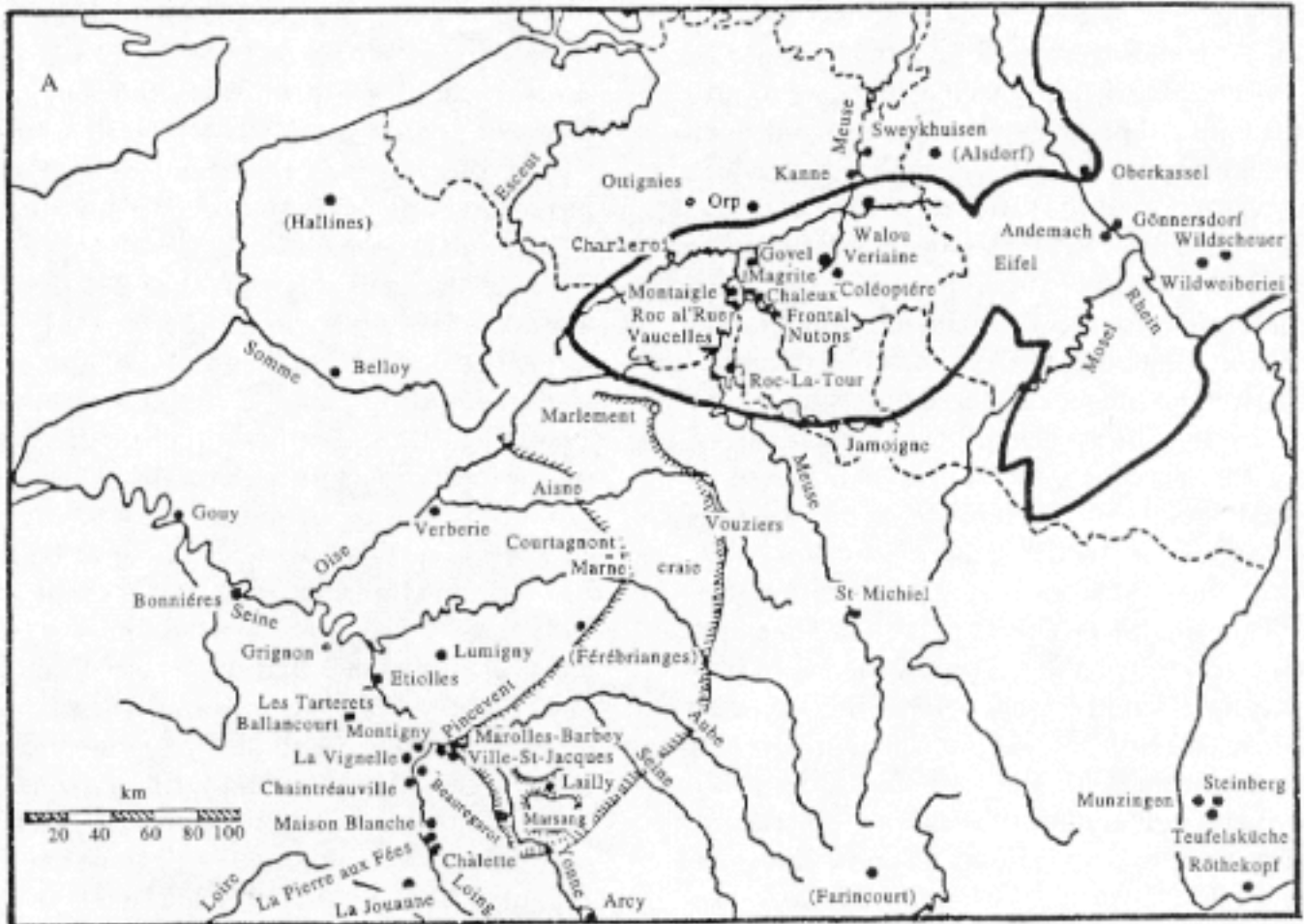


Fig. 1.(A) the Magdalenian north of the Loire. (precedent page)

Thick fine: edge of the Primary Ardenne Plateau and Rhineland Massif; dashed fine: edge of the chalk limestone region of Champagne; black dots: Magdalenian sites (those in parentheses are either early Magdalenian [Hallines, Farincourt] or doubtful [Alsdorf, Férébrianges]); Open circles: known lithic sources. (B) Magdalenian and Epipaleolithic sites in northern France (after Fagnart, 1993). The apparent concentrations of sites in the Seine and Somme valleys stem from quarrying operations that have been closely monitored by archaeologists.

THE INITIAL EPIPALEOLITHIC: FEDERMESSER AND Tjongerian

For Alleröd and Dryas III our information is only good for the Netherlands, northern Germany, Belgium and (recently) Picardy, where the Alleröd landscape was occupied (Fig. 2A) by an Azilioid industry, the Tjongerian, which is part of the **Federmesser** ('penknife' or 'Azilian point') group. **These points are arrow tips propelled by bow** (Rozoy, 1978(p. 1009), 1992c). Bosinski (1993) insists that all these industries be called 'Azilian', just as one calls most of the assemblages in western Europe for the preceding period 'Magdalenian'. But that would blur significant regional differences, whose very identification is a crucial aspect of modern research (Rozoy, 1993a). The number of sites in these regions shows that the lacuna in much of the northern half of France was the result of a research problem: we did not know where to start looking for sites of this period in these landscapes. Fagnart (1993) has just recently been able to determine the intensity of Tjongerian human occupation of the region of Picardy: the sites are generally buried under recent alluvium; almost every sand/gravel pit inspected seriously has yielded evidence thereof at a rate of about one site per hectare for all Leptolithic periods combined (Fagnart, 1994) (Fig. 1 B). In Germany, there are **Federmesser** sites on the surface just about everywhere that the Alleröd ground surface has not been eroded or covered. Sites of this period are just now beginning to be found in the Paris Basin (Bosselin, 1982, 1983; Fosse and Locard, 1986---1987; Fosse, 1993, 1994; Bodu c't ai., 1994b; Fosse and Valentin, 1994) and in eastern France (thevenin and Guillot, 1989; Vanetti and thevenin, 1989). The essential difference with the Final Paleolithic is that the latter occupied less than a fourth of the available territory. **The use of all of it began with the invention of microliths**, due to the power of bow hunting (Rozoy, 1993b). Although the sites are small (Fagnart, 1993 (p. 248)), they are much more numerous.

Despite the many sites that have been excavated in England, Netherlands and Belgium (both on the plains and in hills), **no well-defined social territories have yet been discerned** by archaeologists. Newell and Constandse-Westermann (1986, 1995, 1994; Newell, 1994a, b, 1990) have determined, by comparison with submodern hunting groups in North America living under very similar ecological conditions, that none of the 10 best-documented single-occupation Azilioid sites at their disposal was used as a residential camp. They reject any division for this period into geographic or temporal units (e.g., 'Tjongerian', 'Rissenian', 'Creswellian') and propose the hypothesis that there was just one big social territory whose base camps were in the now submerged combined delta of the Paleo-Thames and Rhine. This territory would have been that of a tribe or language family whose bands seasonally or alternately exploited the biotopes of the interior or of the coasts. If it was a language family, the question of constituent tribal territories remains pending, but unresolvable, according to Newell, due to the submersion of the critically diagnostic base camps.

The alternative would be a kind of territorial exploitation system based on constantly moving from one small site to another without any distinction between residential and other types of (logistical) sites (Bosinski, 1988, 1990; Fagnart, 1993 (p. 264)). This is probable given the marked difference that appears from the beginning of the Federmesser (i.e., with the widespread adoption of the bow) vis à vis the preceding Magdalenian: sites that are much less specialized, small, but numerous, with suggestions of high human mobility (Fagnart, 1993 (p. 248)). The spread of sites with backed points throughout the whole Paris Basin (and more widely, throughout all of France, down to the Pyrenees) would suggest the existence of regional social groups: one cannot conceive of just one tribe for half of western Europe. Bosselin (1982, 1983) has stressed the unique characteristics found at St. Pierre du Bosguérard and other Norman sites that are hard to lump in with previously known industries of this period, for example. We must continue along this vein and base our comparisons on statistical comparisons among whole assemblages, not on categorization of residential sites or specialized camps, which may no longer even have existed as such **if logistical exploitation of the environment was replaced by residential mobility**. Under this hypothesis the delimitation of social territories would also remain to be done.

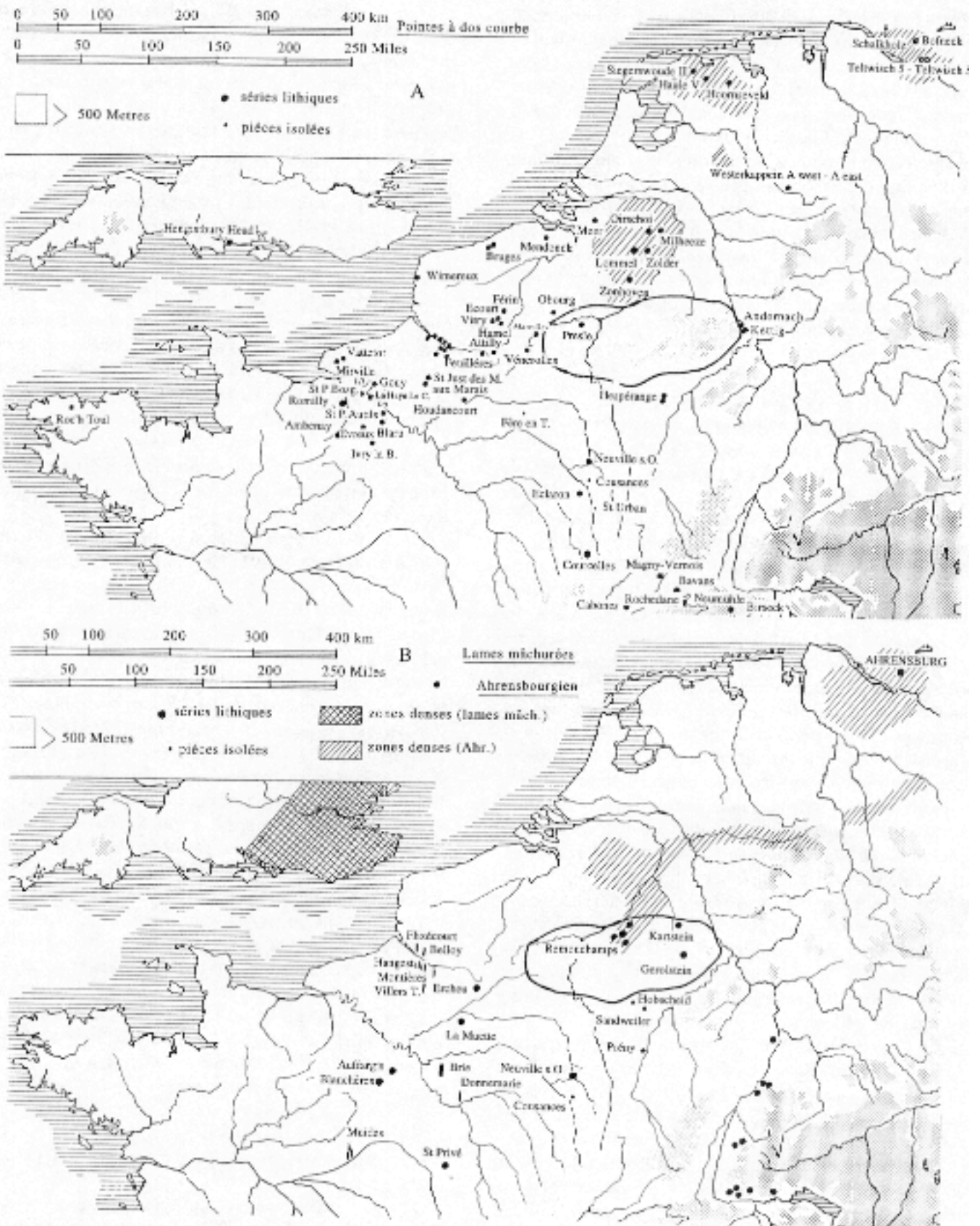


Fig. 2. (A) Curved-black point sites.

Haiching: area of dense Tjongerian finds based on Rozoy (1978) (p. 106), subsequently expanded especially in Belgian Campine according to Vermeersch (1984). German sites not included. **(B) Ahrensburgian and other tanged point sites.** Hatching: area of dense Ahrensburgian finds. Dots: isolated sites. The German distribution has no doubt been enriched subsequent to publication of Rozoy (1978), but the rest of the map has been updated after Czesla (1992) and with information from recent Mesolithic colloquia. Cross-hatching: area of dense bruised blade finds in England; Short vertical lines: bruised blade sites in France (after Fagnart, 1993, 1994; Fagnart and Plisson, 1994; Bodu et al., 1994)

THE EARLY EPIPALEOLITHIC : AHRENSBURGIAN MALAURIÈ POINT CULTURES AND BATTERED BLADE CULTURES

The Ahrensburgian invented, right in the middle of the Dryas III cold episode, **the oblique truncation of bladelets**, the basis of all later development of microliths. It was not the postglacial warming that was the cause; it was simply an invention. In the Netherlands, Belgium and northwest Germany this culture is distributed between the loess and sandy plains (with open-air sites) and the zone of limestone hills (with four rockshelter and cave sites, including Remouchamps in southeast Belgium). Yet archeologists have not discerned any significant differences in game, industry composition or site structure between these natural regions (Rozoy, 1978). To the contrary, there is a distinction between the regions just cited and the type region of the Ahrensburgian further to the northeast in the same plain (Fig. 28), where the tanged points are bigger (Taute, 1968). There is another difference vis-à-vis the sites of southwest Germany (Cziesla, 1992) which are in hilly country as in the Ardennes. An attribution of the southwest German materials of this period to the Ahrensburgian had previously never been recognized and reindeer apparently did not return to this region in Dryas III. **Thus the nature of the terrain, its relief and flint sources do not seem to play a role** in determining social territories. Nor do the species of game animals (if the faunas found to the south of the Ardennes and Rhineland massifs are confirmed).

There is also a separation between the Northern France-Belgium group and a cluster of several sites recently discovered in the Paris Basin (Fagnart, 1993; Hinout, 1985), where tanged points are rare and were generally replaced by Malaurie or Les Blanchères points (although dating here is still uncertain). Isolated Ahrensburg points have been found on the surface in imprecise contexts in eastern France and Burgundy (Fig. 28); they are probably analogous to the sites in the Paris Basin. Terrain and relief had no significance in all of this, but although one can begin to perceive the existence of a minimum of four distinct cultural groups, the precise delimitation of social units remains to be done in all these regions, for which purpose we cannot yet specify any natural features (river basins, for example) which could have played a role in their geographic definition.

There is a broad distribution of tanged points throughout France, Luxembourg, and Germany, first in many cases from the classic zones of the Ahrensburgian, and generally found in association with backed points (Fig. 28) (Hinout, 1985; Schmider, 1994; Rozoy, 1978 (pp. 381-386); Giraud and Vignard, 1946; Thévenin and Guillot, 1989; Huchet and Thévenin, 1994; Krzyzanowski and Rozoy, 1994; Cziesla, 1992). One can perceive in this record **both the beginnings of weapon tip diversification** (which would become a constant among the bow hunting cultures) **and the development via spatial mosaic** (Rozoy, 1992a); types invented in one area would diffuse into neighboring territories, but would be used there only moderately, often in modified form. This spatial mosaic was absent in the Mousterian; it is unknown, or at least not apparent, in the Upper Paleolithic.

The industries with battered blades, attributed to the transition between Dryas III and Preboreal, have only recently been identified in France (Fagnart, 1993; Boucher, 1994; Bodu et al., 1994a,b; Fagnart and Plisson, 1994; Dumont, 1994). It is possible that they belonged to the Ahrensburgian or, more likely, to its western equivalents which especially used obliquely truncated and backed points. These assemblages are just workshop facies, so one cannot talk about social territories in these cases. At the most one can presume, given the distances involved, that these sites in Seine-et-Marne, Loir-et-Cher, Somme and England, belonged to several human groups for which future research may reveal their characteristics. Depending on whether one would stress the common traits or accentuate differences of detail, researchers can make the battered blade industries either into one group (with minor subdivisions) or several related cultures. But in any case there seems to be no relationship to either terrain or relief in the geographic distribution of these kinds of assemblages. Their location near sources of abundant, good-quality flint is striking, which is normal in a workshop facies but which has no cultural meaning in itself.

END OF THE EARLY STAGE: THE TARDENOISIAN AND OTHER CULTURES

The regional bowmen's cultures were already constituted by the end of the Preboreal. They had probably already begun to form among the Azilioid cultures, but the available documentation does not yet permit us to establish the nature of this process. At the end of the early Epipaleolithic stage we only know of

a few sites (Fig. 3A), most of which, however, are well differentiated (Fig. 38 and C). The southeast Brittany group is represented by La Brenière (Gouraud, 1992) and Kerjouanno (Rozoy, 1978) with isosceles and scalene triangles. The Finistère group (the hypermicrolithic Bertheaume industry) is foreshadowed by Enez-Guennoc (Landeda) (Kayser, 1989), where, as in the contemporaneous British Maglemosian, there are only simple obliquely truncated micropoints. On the Cotentin Peninsula, the site of Flamanville (Lefevre, 1993), at the very beginning of the Boreal, is also dominated by these simple points. The Somme culture is first seen at Hallles (Ducrocq, 1989; Rozoy, 1994a) where these points are surpassed numerically by segments -- with an imbalance of weapon tip types unparalleled in the Tardenoisian. These cultures of the northwest (in contrast to those of southern and southeastern Brittany) used few triangles. Thus it is not the isosceles triangles that permit us to recognize the early stage here, but rather the abundance of points with unretouched base that is temporally diagnostic, along with other elements, notably among the common tool types. **These are all stylistic variants having no perceptible environmental cause.** Everywhere there were several classes of weapon tips in use at the same time -- normally 4-5 (Rozoy, 1992d). This is in sharp contrast with the monotony of points among the Azilioid cultures.

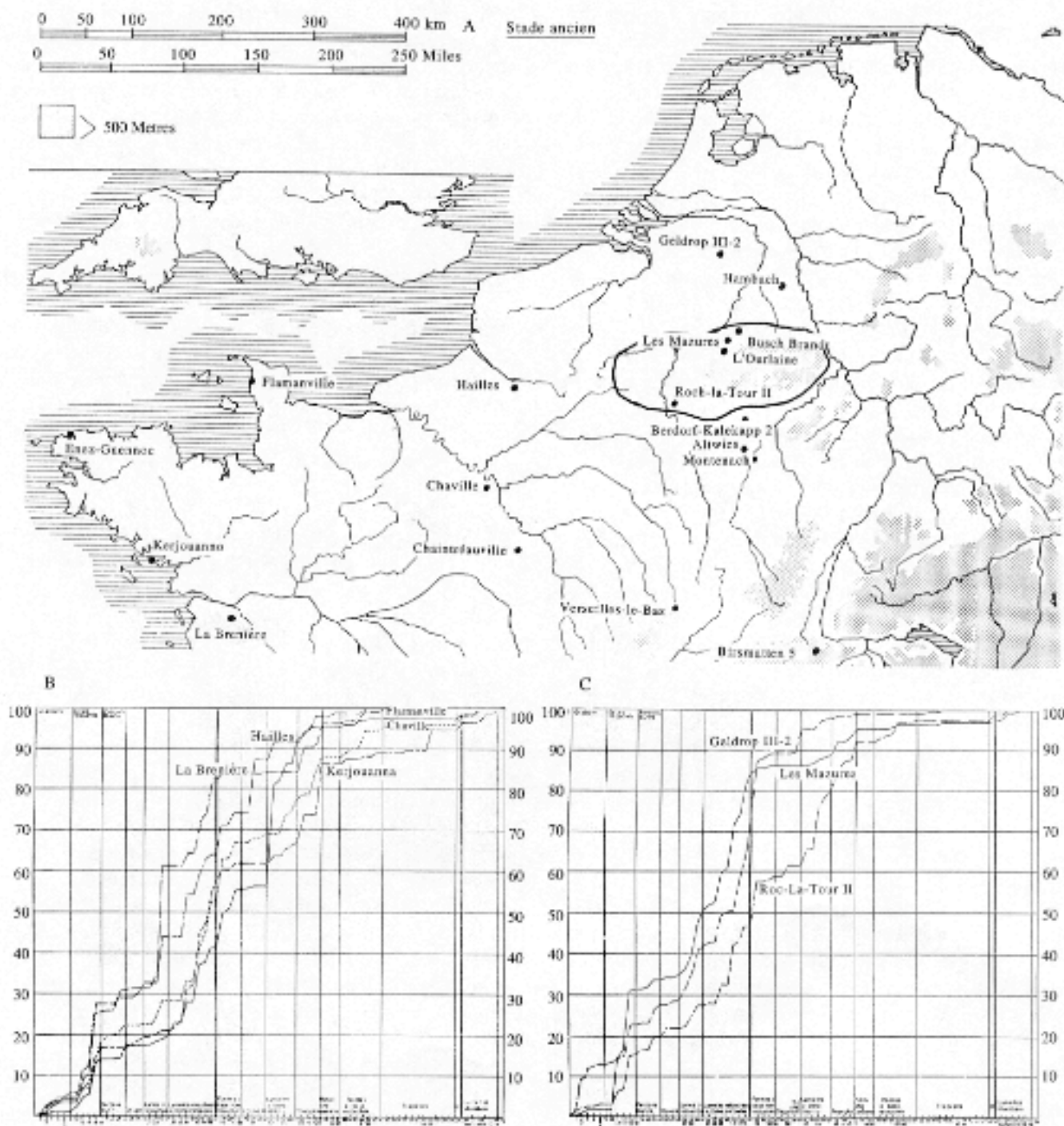


Fig. 3. (A) Sites dating to the end of the Early Stage. (precedent page)

Late Preboreal groups are only defined with reference to those of the Middle Stage, which are more abundant. However the differing compositions of mic industries (Fig. 38 and C) show that distinct socio-territorial groupings had already formed.

(B) Composition of Tardenoisian and Western industries at the end of the Early Stage.

Samples: La Brenière = 295 retouched items (Gouraud, 1992); Kerjouanno = v 8 (Rozoy, 1978); Chaville 3 = 130 (Rozoy, 1978); Flamanville = 831 (Lefevre, 1993); Hallles = v 6 (Rozoy sort). The latter is distinguished by the presence of retouched flakes, segments and one invasively retouched point fragment, and by the absence of isosceles triangles. The cumulative percentage graph for Flamanville is distorted by the inclusion of backed bladelets among the arrow tips; isosceles triangles are absent here. The fact that the curves for La Brenière and Kerjouanno, on the other hand, and Hallles and Flamanville, on the other, cross, clearly suggest the existence of regional differences by this time.

(C) Composition of Northern industries at the end of the Early Stage. Samples: Geldrop III-2 = 352 retouched items; Les Mazures = 186; Roc-la-Tour = 198 (Rozoy, 1978). These sites are distinguished by the percentages of arrow tips, endscrapers, retouched flakes, truncated, shouldered and basally truncated points, with crossings among the curves that signify the existence of three different social groups that are confirmed in later stages.

In the early Tardenoisian (Rozoy, 1978) the weapon tip craze began. This group encroached on the edge of the Ardennes with the site of Roc-la-Tour v, but there is a clear difference with the two known sites of the early stage in the Belgian Ardennes (Rozoy, 1978), which are distinguished from the Tardenoisian by their style of débitage, by their tools and by the abundance of retouched flakes. The early Limburgian at Geldrop III-1, further North, used more endscrapers than retouched flakes: thus the distinction between the Limburgian and the Ardennian seems to be confirmed. In Vuxembourg, Altwies-Haed (Ziezare, 1989), confirmed by Berdorf-Kalekapp 2 (Blouet et al., 1984) and by Montenach in Lorraine (Galland, 1995), and further south in Verzeilles-le-bas (Huet and Thévenin, 1994), are just as clearly different from the Tardenoisian as is the Ardennian, with low percentages of weapon tips, abundant endscrapers, or retouched flakes, and very different débitage styles and tool manufacturing processes. In Germany, the Hambach group (Arora, 1976, 1978) used many endscrapers. In Switzerland, Birmatten (Rozoy, 1978) has mainly retouched flakes as tools. But the distances are too great (200-100 km) and the number of sites too small for one to either confirm or deny the existence of cultural communities among all these sites. **The complete occupation of the landscape shows that the global population had increased** since Magdalenian times, when people were restricted to only certain territories to avoid a dispersion that could lead to extinction. But we are not yet able to estimate the size of the population increase for the Early Stage of the Epipaleolithic. Tribal territories still could have been larger than in the Middle Stage.

There remain several other problems to be solved. In Brittany there is an apparent analogy between the assemblage of Kerjouanno on the one hand with Chaville (south of the Seine) and on the other hand with Roc-la-Tour v of the Northern Tardenoisian (Rozoy, 1978 (Plates 201 and 207)), though we cannot say that this signifies the existence of a widespread social community. Despite various problems, one is sure to find divergences between the Tardenoisian and the industries of southern Brittany as far back as the early stage. The distances are simply too great from the latter region to sites like Chaintréauville, Chaville and Roc-la-Tour (450-675 km); they exceed those observed between sites of the Tardenoisian, Ardennian, Limburgian, Somme and other cultures, including those of Altwies, Montenach and Verzeilles, whose clear differences are further confirmed by subsequent developments in each region. Kerjouanno, with its triangles (mainly isosceles) is also frankly different from the sites of western and northern Brittany; it probably belongs with a west-central French early Epipaleolithic group.

Terrain, relief and distance to flint are not involved, since Ardennian sites are located in different kinds of terrain which have counterparts among the Tardenoisian and Limburgian sites. The Ardennian people used imported raw materials from the south (marble) and north (Belgian and Dutch chalk flint) and made the same kinds of tools from both sources. The forest and the animals were the same and were used in the same ways in each region. **The factor of unity** which gives each culture its cohesion already seems to be **purely internal to each social grouping**.

THE MIDDLE EPIPALEOLITHIC STAGE CULTURES

Beginning with the Boreal, the number of well analyzed sites is such that we can trace the limits of social societies on the basis of social territories (Fig. 4). The geographic grouping of typological and

stylistic peculiarities argues strongly for an ethnographic interpretation (Rozoy, 1980, 1991, 1992, 1994a). However the delimitation of cultures is incomplete due to a lack of sufficient regional studies of both qualitative **and** quantitative nature (Rozoy, 1980, 1991a, 1994a). Although the existence of distinctive regional groups has been recognized, often the absence of detailed studies of neighboring groups does not permit precise demarcation of boundaries. The best-defined culture is the northern Tardenoisian, which separated from the southern Tardenoisian in the Middle Stage, although the southeastern boundary is still not well established due to lack of research. With the exception of the Bertheaume group (Kayser, 1989), the groups presented here with small geographic areas (ca. 3000 km²), insufficient for the survival of an endogamous dialectical tribe represent only the beginnings of research of this sort. The existence of an autonomous culture in each of these regions is evident due to the large quantities of assemblages from one or two well-excavated type sites for each group (e.g., Montclus, Ogens-Baulmes, Birmatten, Beuron) or clusters of nearby sites (as in the case of the Montadian), even surface sites. Yet, due to the lack of comparable sites, we cannot determine the edges of these cultural groups. The sites of Quatre-Arpents at St. Privé (Huchet and thevenin, 1994), for example, just recently led Violot (1994) to propose an eastward extension of the Beaugencian with its very particular débitage style. This is possible, but would suppose inclusion of the Richoux group of sites (Pigeot, 1973). These sites manifest some differences vis-à-vis both the Beaugencian and the southern Tardenoisian. This is just one example; there remains a lot of work to do to explore around known culture centers as well as in archeologically nonsurveyed territory. For instance, in the 250km that separate the Beaugencian and the Sauveterrian one could argue at present either for a continuum of artifact composition changes or for one (or two) boundaries between these two cultures and the Tardenoisian.

The geographical areas occupied by the **archeological cultures** in this period (Rozoy, 1978) probably corresponded to **tribal territories** - if one can use for hunter-gatherer a term more appropriate for describing Neolithic farming societies (Service, 1968). There was no central authority and organization was provided at the level of the band, not at the level of the tribe (Service, 1971; Newell et al., 1990 (p. 23)), so there are no living equivalents for such groups, which one should perhaps refer to as **peoples**. The Middle Epipaleolithic bands were apparently always smaller than those of the Magdalenian, thanks to the power of the bow, but they were much more numerous. The unity maintained by each culture during the course of millennia implies the existence of frequent contacts and exchanges among bands - including intermarriages, with **band exogamy and intra-culture endogamy** on the order of 80%. There are many very large sites (e.g., Piscop, Auliargis, Champs Bertin), but modern excavations (e.g., Le Tillet (Rozoy, 1994a)) show that these are in fact palimpsests of many small and middle-size occupations. These characteristics are common to and stable among all stages throughout Europe, a fact which **exclude environmental determinism as a causal factor**.

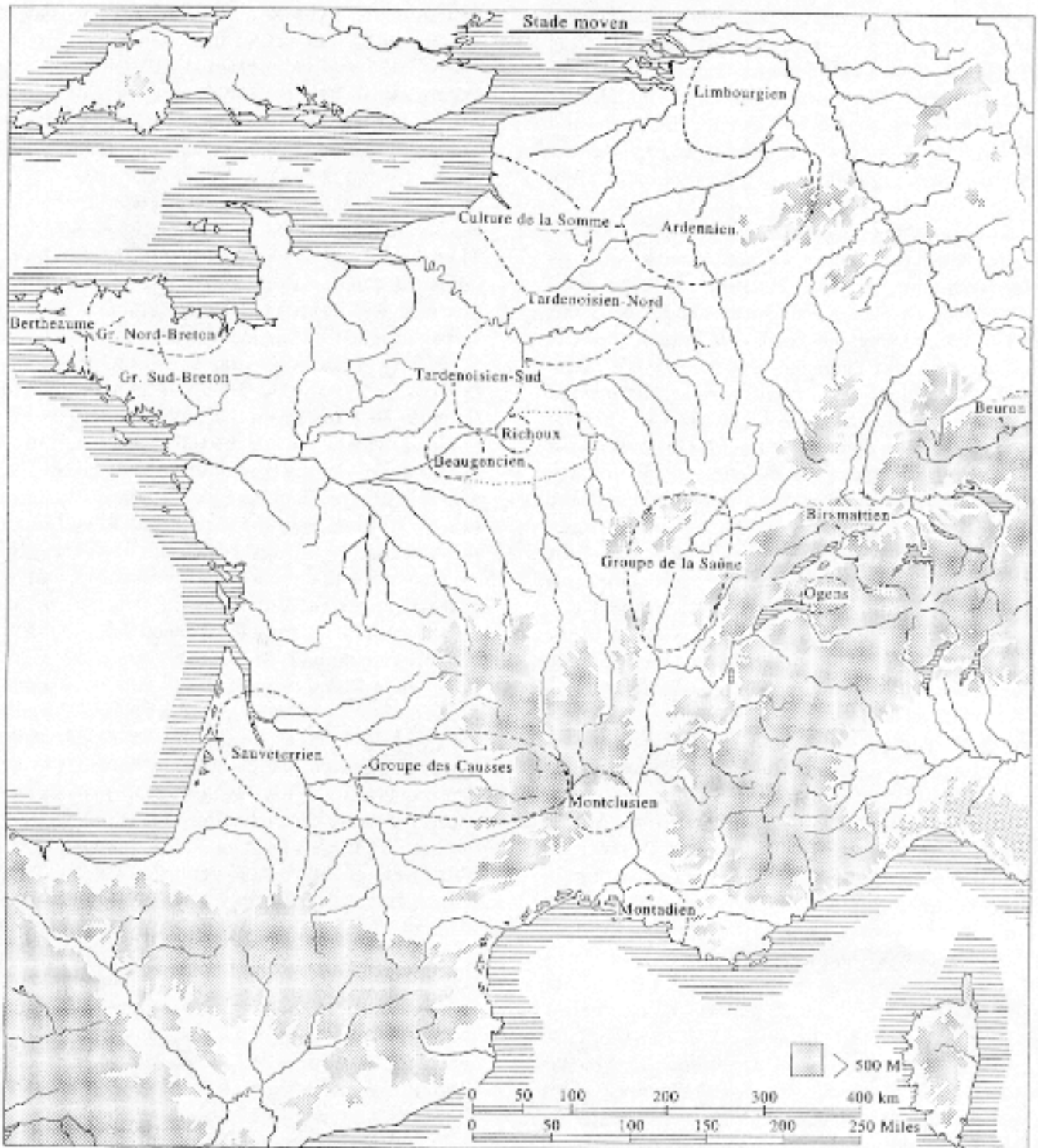


Fig. 4. Cultures of the Middle Stage.

Satisfactory territorial demarcation is only possible for the northern sector and for Brittany. Other cultures can only be delimited with reference to their neighbors, which have not yet been studied in any detail.

Some authors (e.g., Kozłowski, 1975, 1980; Rozoy, 1991a (p. 85)) have described much broader areas on a selective qualitative basis. Each has grouped some 15-20 (or more) archaeological cultures and, when some degree of consistency can be demonstrated, they are argued to represent language families or even larger units. These have **no relationship with the environment**, since they cross out many ecological zones. Thus for Kozłowski the Sauveterrian (*sensu lato*) extends across the plains of Aquitaine, the plateaux of Quercy, the valleys of the Rhône and Saône, the Jura uplands and a significant part of the Alps. The 'Beuron-Coigny culture', according to the same author, covers the whole south of Germany (calcareous and hilly), the Ardennes (silicious), the loess plains of Brabant and Picardy, and the Paris Basin all the way down to the big bend of the Loire. The relative homogeneity of such vast entities and especially

their precise limits can neither be confirmed nor (more likely) rejected without rigorous, detailed qualitative and quantitative analyses of their constituent cultures, only some of which have even been adequately defined and described.

Cultures identified for the Middle Epipaleolithic stage cover areas on the order of 15,000-20,000 km², just as for the occupied areas of the regional groups of the Magdalenian. Populations are estimated from the nutritive capacity of each territory to have ranged between 1000-3000 people per culture (Rozoy, 1978, 1994a), again in the same order as was the case for the Magdalenian for evident reasons of population dynamics (Newell and Constandse-Westermann, 1986 (p, 270); Rozoy, 1992c (p. 185)). The difference, which is considerable, is that now there are no empty zones between groups. Each culture knows and visits its neighboring cultures; the archeologist can discern manifest technical and stylistic influences around the territorial boundaries of these groups. But these are nonetheless limited, since traditions clearly maintained the individuality of each group's own characteristics. There were, however, many exchanges of members among regional groups; just as in the Magdalenian (Gambier, 1992; Garralda, 1992; Billy, 1992) all of Europe constituted a single reproductive population- and for good reason, since population density was too low to permit strict coincidence of the dialectical tribe with the reproductive population (Constandse Westermann and Newell, 1989; Newell et al., 1990).

In Brittany, however, there seems to have been a significant reduction in social territory sizes (Fig. 5). Fairly homogeneous in its soils and relief, this peninsula of 15,000 km² seems to have been divided among several groups according to the observed differences among flint industries (Kayser, 1989). Perhaps the existence of very indented rocky coastlines with abundant, accessible marine resources permitted the existence of smaller territories. It has been observed in California, for example, that some sub-modern foraging groups could reach population densities and sedentism as high as those of some farming societies as a result of marine resource exploitation and a more structured social organization (Constandse-Westermann and Newell, 1994). Thus there could have been a significant environmental influence in this case on the size of social territories. But this idea is contradicted by calculations of the food values supplied by shellfish which show that mollusks could only have been supplements to the main diet (Rozoy, 1978 (pp. 1034-1039)). If the cultural subdivisions for Brittany proposed by Kayser (1989) are well founded (which seems to be the case), there must have been a major dietary contribution from coastal fishing, which is not yet demonstrated. Perhaps this included salmon storage, as in the case of Indian cultures along the American Northwest coast? But at the present time we have no actual evidence for such storage or resultant sedentism in Brittany. The alternative to this picture would be that Kayser's three West-Brittany groups were actually sub-groups of a single large culture, which would bring Brittany into conformity with the general rule of Epipaleolithic cultures covering ca. 15,000km². Further work should clarify this, but a special research program would be needed to really determine the nutritive values of all marine food resources that are accessible from the shore, as well as to determine the nature of relations among the various population groups on the peninsula.

In general, the cultures display great stability through time on their traditional territories. Gradual modifications in the industries leave no doubt as to their cultural affiliations. **In situ** changes show clear evidence for the long-term maintenance of even local techniques, especially of a stylistic nature (e. g., marginal retouch). Such peculiarities persist across millennia, despite overall changes in industries and in climate. **Frontiers, however, were often permeable to inventions:** including new techniques such as oblique truncation, micro-burin sectioning, or trapezes, each of which spread throughout all of Europe within less than a century nevertheless, there were always some groups which rejected new techniques and each culture could and did adopt inventions in its own way. Specific types of weapon tips (e.g., Tardenois points, invasively retouched points) diffused over more or less long distances outward from their places of invention; this is the spatial mosaic on which we have insisted (Rozoy, 1992a). Cultural boundaries also allowed the passage of fads and styles, even if it was with exceptions. The Coincy débitage style, marginal retouch, scalene triangles with a concave short side, truncation of the distal ends of points and the sectioning of points by means of the microburin technique are examples of such 'fads'. According to their utility, or the aesthetic taste of the hunters, these fads diffused over differing distances, sometimes across as many as 3-4 cultures' territories.

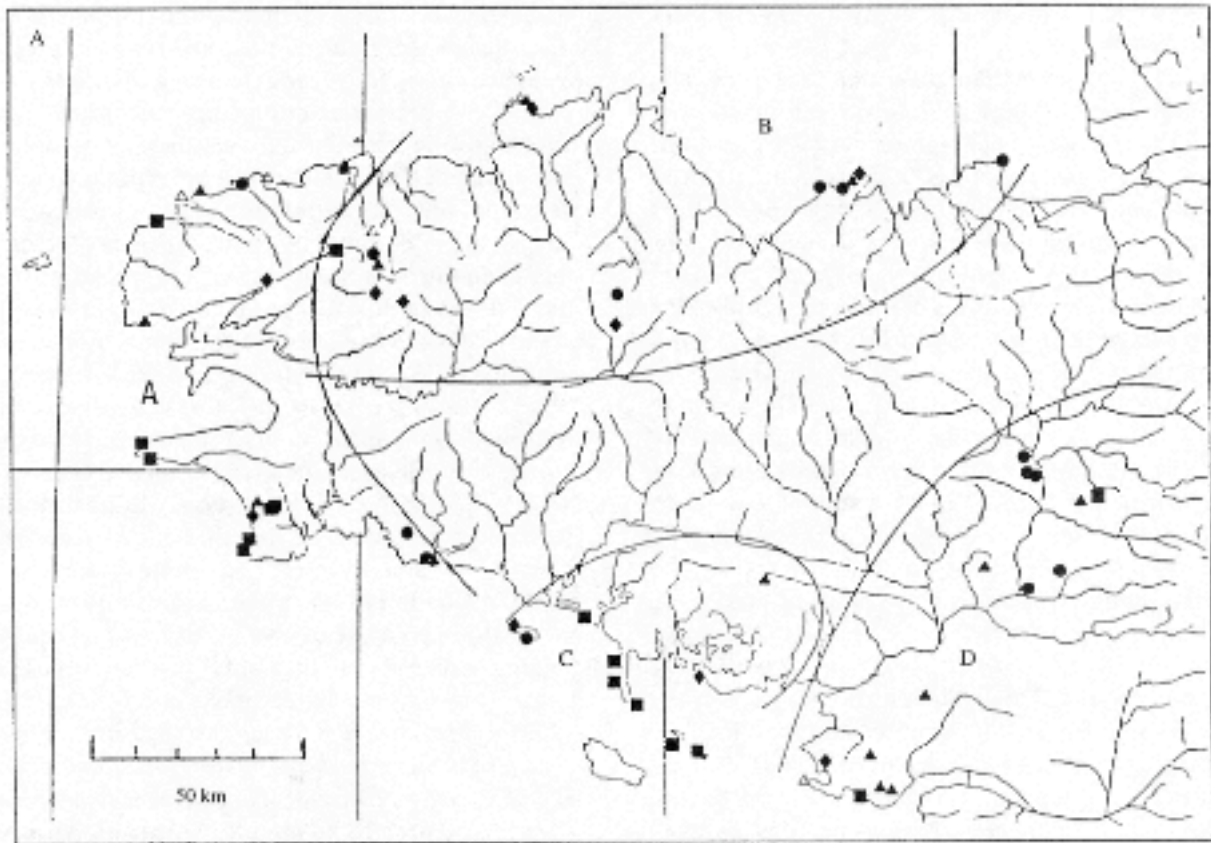


Fig. 5. (A) Mesolithic human groups in Brittany (after Kayser, 1989, 1990).

Sea level is still somewhat low (- 40 m in the Preboreal; -10 m in the Recent and Final Epipaleolithic Stages), but the creation of estuaries by post-glacial transgression may have led to the formation of the Western cultures with small territories, especially the Bertheaume industry in Finistère. The southeastern Brittany group, though as yet poorly defined, probably had a broader extension inland, with a more normal territory size.

(B) Cultures of the Recent Stage. Kayser (1992) maintains the existence of smaller groupings in Brittany, such as the Teviecian. In SE France the nature of the transition between the Montadon and the Castelnuov>fan cultures has been demonstrated, although at Monclus it must have occurred not earlier than the second half of the 6th millennium BC with the appearance of trapezes and a change in microlith manufacturing technique.

(C) Cultures of the Final Stage. The only notable changes occur in the Southeast, with the inland spread of the Castelnovian, the 'neolithization' of the coastal zone and the subsequent break in relations between the coastal and interior groups.

These frontiers stayed quite constant over time. The only change we have been able to discern up to now concerns the limit between the Northern Tardenoisian and the Ardennian (Rozoy, 1990), which retreated southward between the early and middle stages, even down to the Marlemont flint source. In contrast, supposed changes in the boundary between the Tardenoisian and Somme cultures between the middle and late stages have proven to be illusory (Rozoy, 1994a). But another sort of change that was probably more frequent was the **division of a single culture into two "daughter cultures"**. During the middle stage the Tardenoisian, this initially unitary culture, broke into two units which would become quite distinct by the late stage. The new frontier would be along the Seine. This phenomenon is the result of processes that are well known to ethnographers, as division occurs once population reaches a limiting value, although that limit seems variable, somewhere between 3000-10,000 people (Newell et al., 1990). Such processes were probably responsible for developments in southwest France, where a separation occurred resulting in the development of the Causses group on Quercy (with Montclus triangles) and of the Sauveterrian, as demonstrated at the site of Fontfaurès (Barbaza et al., 1991).

None of these cultures correlate with relief or terrain types, all of which had analogous types of forest with the same game species. (the apparent absence of sites of this period on the thick loess soils of the Hesbaye plateau in middle Belgium and in the Lower Rhineland could be the result of intensive plowing and erosion.) Lack of flint was mitigated in the Ardennes as in Brittany by importation from neighboring regions and, sometimes, by the use of inferior-quality materials. Rivers sometimes played the role of frontiers: the Seine separated the Northern and Southern Tardenoisian, the Oise separated the Northern Tardenoisian from the Somme Culture. But they could also unify: the Ardennian developed within the basin of the Meuse as it pushed the Northern Tardenoisian southward into the Aisne and Marne basins, while the Sambre-Meuse trench to the north was a limit for the Ardennian. The Beaugencian occupied the middle valley of the Loire, but its extension to the east as far as the Yonne department (Violot, 1994), if confirmed, would minimize the influence of rivers in this case. Likewise, the Saône group was centered on that river but was delimited to the south at its confluence with the middle course of the Rhône.

THE RECENT STAGE OF THE EPIPALEOLITHIC

The recent stage began a little **before the Atlantic** climatic phase. Typical trapezes and Montbani-style débitage diused very rapidly throughout all of Europe, with the exception of a few hold-outs (e.g., the Beaugencian and Ardennian, the former of which nevertheless adopted in their own way the essential technical characteristics of the new weapons (e. g., larger points) and particular retouching techniques that they applied to their traditional microliths). The rapidity of the spread of the trapeze projectile point testifies to the density of open social relations among related cultures and to the irrelevance of environmental differences to this phenomenon. So fast was their spread, that it has been hard to establish the point of origin of trapezes, since radiocarbon dates for their appearance are the same from the Ukraine to the Périgord: 5850 BC (uncal.) or three centuries **before** the climatic change. Righthand lateralization (asymmetry) of points to the North of the Seine in the Northern Tardenoisian (with 80% frequency) can be shown only to have started in Belgium, where the 'fad' began a little earlier in time among invasively retouched points (Rozoy, 1978 (p. 907)). We do not know the reasons for this development, although one can presume it to have been related to some improvement in propulsion (perhaps the development of the stronger recurved bow?)

The development of trapezes before the climatic changes to more humid Atlantic conditions effectively excludes any influence of the latter phenomenon on the former. And their rapid adoption over vast areas shows that the invention was not tied to any particular terrain, game or other environmental factors. Point types from the middle stage persisted for up to a millennium, depending on each culture, although some did change a bit, and the trapezes only replaced them gradually, a fact which stresses the importance of cultural continuity in each region. But several indices show that these 'old style' points were losing the central roles that they had once played in Epipaleolithic weaponry, especially, as their modes of fabrication were changing (Rozoy, 1978 (p. 506)). The different varieties of trapezes, which were used differently (Rozoy, 1978 (pp. 498-503)) allowed these new forms to assume all the functional roles of the old types. The use of notched (Montbani) blades was less widely diused, and in a very unequal fashion among cultures. They were precocious in the Tardenoisian zones (where they probably originated), later to

the south of the Seine despite a similar set of environments, and rejected by the Ardennian (which also rejected trapezes) in schist and limestone hill country and by the Beaugencian on the silt-covered plains. Trapezes only penetrated far into the Lvnburgian of the north on sandy plains like those of the Tardenoisian. This is yet one more case of cultural indifferance to substratum conditions.

The social territories remained essentially the same (Fig. 5B) with maintenance of stylistic particularities allowing us to perceive evidence for continuity within given areas over millennia. The division of the Tardenoisian became complete in this period, with very different use of the Montbani blades and bladelets in the two daughter cultures. The break had nothing to do with climate, but rather with internal demographic and social factors. The south-Breton group became further differentiated at this time in the form of the Teviecian, distinguishing itself now from the Retzian. Cultural divisions are suggestive of population growth, despite the fact that some have considered the closed Atlantic forests to be less than optimal for humans because they were dense and dark, with supposedly little fodder available for herbivores given a lessened understory and fewer clearings. In fact, however, the virgin forest, which has never been felled, is not uniform like modern (silvicultivated) forests, with trees all of the same size and age. In natural forests, natural falls of old or sick trees and storms that fell trees of all ages create openings here and there, with copse favorable for cervids. In any event, it was under the densely wooded conditions of the Atlantic that more cultural divisions than ever were created and sites are at least as numerous as in the earlier stage. As in the middle stage, there are small sites (e.g., Rochers d'Auliargis) and 'bigger' ones (e.g., Bergumermeer, Lommel, Zonhoven, Allée Tortue, Les Hauts de Lutz) on a wide diversity of types of terrain. Population levels were at least as high or higher than before. If, as is probable, trapezes represent technical progress, then they could have helped cause a slight demographic expansion.

THE FINAL STAGE OF THE EPIPALEOLITHIC

The final stage covers most of the 5th millennium BC (uncal.). Point types inherited from the Middle Stage have by now more or less totally disappeared (except for a few 'mistletoe leaves', invasively retouched points in the Tardenoisian and circle segments in the recent Beaugencian). There is, however, a considerable diversity of weapon tips: added to (or substituting for) those of the Upper Stage are derived types which are no longer really trapezes *sensu stricto*. These types developed in situ and include points with inverse flat retouch, often with semi-abrupt retouch and retention of the piquant trièdre from the microburin snap. Some are still trapezes, others are not, such as large scalene triangles with inverse flat retouch (Belloy arrowheads), spurred tips, Sonchamp points or Bavans points. In the Beaugencian the same technical characteristics were applied to Tardenois points, which no longer look like the originals however. There are still both small sites (Belloy-Plaisance, Ruiterskuil) and a few very large ones (e.g., Allée Tortue at Fère-en-Tardenois (Rozoy and Slachmuylder, 1990)). There are thus no objective reasons to suppose the existence of larger bands than before. Contacts and exchanges among bands continued to be intensive, and testify to the unity of each culture. Limits among tribes continued to be permeable, however, with inventions and fads spreading across all of Europe, irrespective of the great diversity of environments involved. It is presently impossible to pinpoint the points of origin of the fast-spreading 'fads'.

All of these stylistic developments, with no ballistic consequences, represent no change in lifeways, but do ease our task in perceiving cultural territories. There are indeed a few Belloy arrowheads in the Tardenoisian of Allée Tortue Xb, but almost no trapezes in the final stage of the Somme Culture. The spurred weapon tips of the Retzian do not appear in the Teviecian, etc. The essential differences concerning the common tool types (e.g., endscrapers, retouched flakes, perforators, etc.), and weapon tip percentages remain about the same as before, with only some qualitative changes.

There are no marked changes in social territories vis-à-vis the Late Stage (Fig. 5C), except in the case of the now 'neolithized' Mediterranean coast, with its Cardial culture overlain on the local Castelnovian Mesolithic as a result of external factors (notably the importation of sheep which had not existed in the region before). Curiously, the 'pure' evolved Castelnovians in the interior of Provence seem to have broken off relations with their 'neolithized cousins', as there are no further imports of the **Columbella rustica** shell from the coast (Rozoy, 1978 (p. 299)). They in their own turn were 'neolithized' a millennium later, building on their locally evolved technical base, at the same time as the rest of France. This time lag does suggest a case of environmental determinism: the coast seems to have been more favorable than the interior for the early transition to food production.

The separation of the Teviecian from the Retzian became marked in the final stage of the Epipaleolithic. The number of cultures seems to increase, and especially the individuality of each one comes

more sharply into focus, without any influences from the Neolithic. A perfect knowledge of each landscape and growing group identification combined to play a significant role in the rapid process of acculturation to the Neolithic that was to occur in the 4th millennium BC.

CONCLUSIONS

The environment was not without effect on the life of hunters: one cannot hunt reindeer during the Boreal when there are none, for example. Changes in game imposed by the reigning biocenosis (e.g., boar more common in Preboreal, red deer more abundant in Atlantic) do not change lifeways very much and do not influence human social territories at all. Changes in industry are not due to climate changes, but rather to technical inventions having to do with hunting that are independent of the environment and that are responses to **permanent** pressure exerted on hunters by their surroundings. The Magdalenian manner of hunting determined by the use of the atlatl and dart (with large herd drives using cul-de-sacs or ambushes at water-crossings) did not permit people to inhabit more than one quarter of the land surface of France.

The development of the bow and arrow had an immediate consequence: use of the whole territory. This continued despite the return of the cold in Dryas III and then during the climatic fluctuations of the Holocene. The various social consequences of this invention took 1000 yr to be fully realized. Social (tribal?) territories in both the Magdalenian and Mesolithic cases covered some 15,000 km² with 1000-3000 people per territory, since the objective laws of population dynamics permit no less to maintain survival; nor do they permit greater dispersal due to the need to acquire mates or help. The essential differences are in the presence of **immediate** neighbors, in the significant increase in overall population, with a high degree of knowledge of the local landscapes, and in psychological changes (Rozoy, 1991a, 1993b, 1994b), which paved the way for the eventual adoption of the food production way of life in the Neolithic.

REFERENCES

- Arora, S.K. (1976). Die mittlere Steinzeit im westlichem Deutschland und in den Nachbargebieten. Rheinische Ausgrabungen, Bonn.
- Arora, S.K. (1978). Uebersicht über das Mesolithikum. In: Alt- und mittelsteinzeitliche Fundplätze des Rheinlandes pp. 143--170. Rheinland, Köln.
- Audouze, F. (1992). L'occupation magdalénienne du Bassin parisien. in: Le peuplement magdalénien, colloque de Chancelade 1988, pp. 345--356. CTHS, Paris.
- Audouze, F., Cahen, D., Keeley, L.H. and Schmider, B. (1981). Le site magdalénien du Buisson Campin à Verberie (Oise). Gallia-PréhisLoire, 24(1), 99-143.
- Audouze, F. and Enloe, J. (1994). Le rôle de l'environnement dans la vie des chasseurs magdaléniens du Bassin parisien. In: Chronostratigraphie et environnement des occupations humaines dit Tardiglaciaire et du début (IL, l'Holocène en Europe du Nord-Ouest, résumés, p. 275. CTHS, Paris.
- Baales, M. (1994). Analysis and interpretation of a new Late Glacial (Federmesser) settlement at Kettig, Neuwied Basin, Germany. In: Chronostratigraphie et environnement des occupation,s humaines. du Tardiglaciaire et du début de l'Holocène en Europe du Nord-Ouest, résumés, pp. 275-276. CTHS, Paris.
- Barbaza, M. et al. (1991). Fontfaurès en Quercy-Toulouse, C.As.R.
- Bar-Yosef, O. (1992). Impact des changements climatiques sur les sociétés humaines à la fin du Pléistocène. In: Le peuplement magdalénien, colloque de Chancelade 1988, pp. 177-185. CTHS, Paris.
- Bvly, G. (1992). La morphologie de l'Homme de Chancelade. Un siècle de controverses. In: Le peuplement magdalénien, colloque de Chancelade 1988, pp. 71-77. CTHS, Paris.
- Bleuet, V., Kartheiser, J., Leesch, D. and Schwenningen, J.L. (1984). Le gisement mésolithique Kalekapp v (commune de Berdorf). Bulletin de la Société Préhistorique du Luxembourg, 6, 1-30.
- Bodu, P., Hantài, A. and Valentin, B. (1994). La "Long Blade technologie" au sud du Bassin parisien: quelques études de cas. In: Chronostratigraphie et environnement des occupations humaines du Tardiglaciaire et du début de l'Holocène en Europe du Nord-Ouest, résumés, p. 277. CTHS, Paris.
- Bodu, P., Julien, M. and Valentin, B. (1994a). Projet collectif de recherche sur les habitats tardiglaciaires du Bassin parisien: bilan des travaux récents. Bulletin de la Société Préhistorique Française, 91(3), 182--184.
- Bodu, P., Julien, M. and Valentin, B. (1994b). La fin du Tardiglaciaire au sud-est de l'de-de-France- Stratégies d'acquisition et de gestion des ressources lithicjues. In: Le Paléolithique supérieur de l'Est de la France, Table ionde de Chauinont, pp. 105- II 7.
- Bosinski, G. (1988). Upper and Final Palaeolithic Settlement Patterns in the Rhineland, West Germany. in:

- Dibble, H. and Montet-White, A. (eds), Upper Pleistocene Prehistory of Western Eurasia, pp. 375-386. Philadelphia.
- Bosinski, G. (1990). Homo sapiens. L'histoire des chasseurs du Paléolithique supérieur en Europe (-40,000-10,000 an. J.C). France, Paris.
- Bosinski, G. (1993). Intervention du Président lors de la soutenance de la thèse de J.-P. Fagnart.
- Bosselin, B. (1982). L'habitat épimagdalénien des Bruyères: essai d'analyse et d'interprétation. Bulletin de la Société Préhistorique Française, 79(5), 138-147.
- Bosselin, B. (1983). Le problème du Paléolithique final en Haute-Normandie. Bulletin de la Société Préhistorique Française, 80 (10--12), 329-334. Boucher, A. (1994). Contribution à l'étude du site de Belloy-sur-Somme par les remontages lithiques. In: Chronostratigraphie, l'environnement des occupations humaines du Tardiglaciaire et du début de l'Holocène en Europe du Nord-Ouest, résumés, p. 277. CTHS, Paris.
- Bridault, A. (1994). Chasseurs, ressources animales et milieux dans le Nord de la France de la fin du Paléolithique au Mésolithique; problématique et état de la recherche. In: Chronostratigraphie et environnement des occupations humaines du Tardiglaciaire et du début de l'Holocène en Europe du Nord-Ouest, résumés, p. 278. CTHS, Paris.
- Charles, R. (1994). Evidence for faunal exploitation during the Late Glacial in the Less valley, Belgium: thoughts on butchery and ethnicity. In: Chronostratigraphie et environnement des occupations humaines du Tardiglaciaire et du début de l'Holocène (en Europe du Nord-Ouest, résumés, p. 279. CTHS, Paris.
- Chavaillon, J., Chavaillon, N., Heurs, F. and Piperno, M. (1978). Le début et la fin de l'acheuléen à Melk-Kuntur: méthodologie pour l'étude des changements de civilisation. Bulletin de la Société Préhistorique Française, 75(4), 105 -1 15.
- Conkey, M. (1992). Les sites d'agrégation et la répartition de l'art mobilier, ou: y a-t-il des sites d'agrégation magdaléniens? in: Le peuplement magdalénien; colloque de Chancelade 1988, pp. 19-25. CTHS, Paris.
- Constandse-Westermann, T-S- (1994). Variabilité dans 70 sociétés de comparaison: durées d'occupation, mobilité, démographie. In: Le Tardiglaciaire en Europe du Nord-Ouest. CTHS, Paris, pp. 469-480.
- Constandse-Westermann, T.S. and Newell, R.R. (1989). Social and Biological Aspects of the Western European Mesolithic Population Structure: a Comparison with the Demography of North American Indians. in: Bonsall, C. (ed.), the Mesolithic in Europe, pp. 106-115. Edinburgh University, Edinburgh.
- Cordy, J-M- (1976). Etude des faunes attribuées au site mésolithique de la Roche-aux-Faucons (province de Liège). Bulletin de la Société Royale Belge d'Anthropologie et Préhistoire, 87, 75 76.
- Cziesla, E. (1992). Ahrensburger Jäger in Svdwestdeutschland. Archvologisches Korrespondenzblatt, 22(1), 13-26.
- Dewez, M. (1987). Le Paléolithique Supérieur Récent dans les Grottes de Belgique. Soc. Wallonne de Paléolithologie, Louvain-La-Neuve.
- Dewez, M., Cordy, J.M. et al. (1983). La couche mésolithique de la grotte du Coléoptère (Boinal-sur-Ovrthe). Société Wallonne de Paléolithologie, Liège, mémoire no. 5.
- Ducrocq, T. (1989). Le Mésolithique du marais de Hallles (Somme). in: Tuffreau, A. (dir.), Paléolithique et Mésolithique du Nord de la France : nouvelles recherches, pp. 109-120. C. E. R. P., Université des Sciences et Techniques Lille-Flandres-Artois.
- Dumont, S. (1994). Essai de structuration des traditions technoculturelles lors de la transition tardiglaciaire-holocène dans l'Europe du nord-ouest. In: Chronostratigraphie et environnement des occupations humaines du Tardiglaciaire et du début de l'Holocène en Europe du Nord-Ouest, résumés, pp. 285-286. CTHS, Paris.
- Dupont, E. (1872). L'Homme pendant les Ages de la Pierre dans les environs de Dinant-sur-Meuse. Bruxelles.
- Elton, C. (1950). The Ecology of Animals. Methuen, London.
- Fagnart, J.P. (1992). Le Paléolithique final dans le Nord de la France: le Magdalénien et les cultures septentrionales. in: Le peuplement magdalénien, colloque de Chancelade 1988, pp. 247-258. CTHS, Paris.
- Fagnart, J.P. (1993). Le Paléolithique supérieur récent et final du Nord de la France dans son cadre paléoclimatique. Thesis, Université des Sciences et Technologie de Lille.
- Fagnart, J.P. (1994). Personal communication, the author thanks his old friend J.P. Fagnart.
- Fagnart, J.P- and Plisson, H. (1994). Fonction des pièces mâchurées du Paléolithique final de la vallée de la Somme: caractères tracéologiques et données contextuelles. in: Chronostratigraphie et environnement des occupations humaines du Tardiglaciaire et du début de l'Holocène en Europe du Nord-Ouest, résumés, pp. 268-287. CTHS, Paris.
- Fosse, G. (1993). Le gisement du Paléolithique supérieur final de Blaru (Yvelines). Paléc, 5, 249-261.

- Fosse, G. (1994). Le Paléolithique final de Haute-Normandie. in: Chronostratigraphie et environnement des occupations humaines du Tardiglaciaire et du début de l'Holocène en Europe du Nord-Ouest, résumés, p. 288. CTHS, Paris.
- Fosse, G. and Locard, M-A. (1986-1987). Deux occupations du Paléolithique supérieur final dans le Pays de Caux (Haute-Normandie): Vattetot-sous-Beaumont et Mirville. *Antiquités Nationales*, 18--19, 133- 142. Fosse, G. and Valentin, B. (1994). Le gisement du Paléolithique supérieur final d'Ambenay (Haute-Normandie). in: Chronostratigraphie et environnement des occupations humaines du Tardiglaciaire et du début de l'Holocène en Europe du Nord-Ouest, résumés, p. 289. CTHS, Paris.
- Galland, S. (1995). Le gisement épipaléolithique ancien de Montenach-Kirschgasse (Moselle) dans son cadre chronologique et culturel. Mémoire de Maîtrise, Université Strasbourg.
- Gambien, D. (1992). Les populations magdaléniennes en France. in: Le peuplement magdalénien; colloque de Chancelade 1988, pp. 41-51. CTHS, Paris.
- Garralda, M.-D. (1992). Les Magdaléniens en Espagne: Anthropologie et contexte paléo-écologique. In: Le peuplement magdalénien, colloque de Chancelade 1988, pp. 63-70. CTHS, Paris.
- Giraud, E. and Vignard, E. (1946). Un rendez-vous de chasse mésolithique: Les Rochers, commune d'Auffargis (S. et O.). *Bulletin de la Société Préhistorique Française* 1946, 7/8, 248-258.
- Gouraud, G. (1992). Le campement mésolithique des Etangs de la Brenière à Montbert (Loire-Atlantique). *Revue Archéologique de l'ouest*, 9, 39-55.
- Hinout, J. (1985). Le gisement épipaléolithique de la Muette I commune du Vieux Moulin, Oise. *Bulletin de la Société Préhistorique Française*, 82, 377 - 388.
- Huchet, A. and thevenin, A. (1994). De l'Ahrensbourgeois à St Privé dans l'Yonne. in: Le Paléolithique supérieur de l'Est de la France, Table ronde de Chaumont, Mèin. S.A.C. 13, Reims, pp. 191 - 204.
- Huet, F. and thevenin, A. (1994). La station mésolithique ancien de Verseilles-le-bas (Haute-Marne). in: Decron, B., Lepage, L. and Viard, G. (eds), *Préhistoire et Protohistoire en Haute-Marne et contrées limitrophes*, colloque. Langres 1992, pp. 58-78. Musées, Langres.
- Julien, M. (1989). Activités saisonnières et déplacements des Magdaléniens dans le Bassin parisien. in: M. Otte (ed.), *Le Magdaléniens en Europe*, Actes du Colloque de Mayence 1987, pp. 177 -191. Université, Liège.
- Kayser, O. (1989). L'Épipaléolithique et le Mésolithique en Bretagne. in: Mohen, J.P. (ed.), *Le Temps de la Préhistoire*, I, pp. 350-352. Société Préhistorique Française and *Archeologia*, Paris.
- Kayser, O. (1990). Le site mésolithique de Totil-An-Naouc'h (Plougoum, Finistère). *Revue Archéologique de l'ouest*, 23 -29.
- Kayser, O. (1992). Les industries lithiques de la fin du Mésolithique en Armorique, *Revue archéologique de l'ouest Suppl. NO. 5*, v 7-124.
- Kozłowski, S.K. (1975). *Cultural differentiation of Europe, from the 10th to the 5th millennium BC*. Warsaw University Press, Warsaw.
- Kozłowski, S.K. (1980). *Atlas of the Mesolithic in Europe (First Generation Maps)*. University of Warsaw Press, Warsaw.
- Krzyzanowski, J. and Rozoy, J.-G. (1994). Une pointe à cran ahrensbourgeoise à Cotisances-les-Forges (Meuse). in: Le Paléolithique supérieur de l'Est de la France. Table ronde de Chaumont, pp. 205-206.
- Laville, H. (1977). Relations: climat-industries. Limites d'interprétation. in: Laville, H. and Renault-Miskowski, J. (eds.), *Approche écologique de l'homme fossile*, pp. 131---137. Université Pierre et Marie Curie, Paris, Laboratoire Géologie.
- Lee, R-B- (1968). What hunters do for a living. In: Lee, R.B. and DeVore, I. (eds), *Man the Hunter*, pp. 30-48. Aldine, Chicago.
- Lefevre, P. (1993). Le site inéolithique de Flanierville (Manche). Mémoire de Maîtrise, Université Paris-I.
- Leroi-Gourhan, A. (1994). Le petit chemin de Miesenheim, in: Chronostratigraphie et environnement des occupations humaines du Tardiglaciaire Et du début de l'Holocène en Europe du Nord-ouest, résumés, pp. 293 -294. CTHS, Paris.
- Leroi-Gourhan, A. and Renault-Miskowski, J. (1977). La Palynologie appliquée à l'Archéologie- in: Laville, H. and Renault-Miskowski, J. (eds), *Approche écologique de l'homme fossile*, pp. 35-49. Université Pierre et Marie Curie, Paris, Laboratoire Géologie.
- Le Tensorer, J.-M. (1977). (participation à la discussion) In: Laville, H. and Renault-Miskowski, J. (eds), *Approche écologique de l'homme fossile*, pp. 136-137. Université Pierre et Marie Curie, Paris, Laboratoire Géologie.
- Martin, P. and Martin, Y. (1984). La grotte de Gouy. in: *L'art des cavernes, atlas des grottes ornées paléolithiques Françaises*, pp. 292-295. Ministère de la Culture, Paris.
- Méloy, B. (1983). Milieu sédimentaire et paysage d'Étiolles. In: Cahier 9 du Centre de Recherches préhistoriques, pp. 55-79. Université de Paris-1, Paris. Newell, R.R. (1997a). La résolution

- ethnique des établissements résidentiels et non-résidentiels. In: *Le Tardiglaciaire en Europe du Nord-Ouest*- CTHS, Paris, pp. 455-467.
- Newell, R.-R. (1994b). Pertinence de l'analyse ethnographique pour l'étude du Paléolithique tardif et du Mésolithique: types et systèmes d'établissements et utilisation du terrain. in: *Le Tardiglaciaire en Europe du Nord-Ouest* CTHS, Paris, pp. 481-494.
- Newell, R.R., and Constandse-Westermann, Ts. (1986). Testing an ethnographic analogue of Mesolithic social structure and the archaeological resolution of Mesolithic ethnic groups and breeding population. *Proceedings of the Koninklijke Nederlandse Akademie van Wetenschappen, Series B*, 89(3), 243-310.
- Newell, R.-R. and Constandse-Westermann, Ts. (1995). *volume V*, in press.
- Newell, R.R., Kielman, D., Constandse-Westermann, T., Van der Sanden, W.A.B. and Van Gijn, A. (1990). *Approach into the Ethnic Resolution of Mesolithic Regional Groups. The Study of their Decorative Ornaments in Time, and Space*. Leiden, New York.
- Noiret-Schutz, C. (1990). Analyse pollinique de l'occupation magdalénienne de la grotte de Chaleux (Belgique, Province de Namur). *Mémoire de Diplôme d'Etudes Approfondies*, polygraphié. Université de Paris-I, UER 03 Archéologie.
- Patou, M. (1992). Apport de l'archéozoologie à la compréhension du peuplement magdalénien dans le Bassin mosan (Belgique). in: *Le peuplement magdalénien, colloque de l'hémicycle 1988*, pp. 309-316. CTHS, Paris.
- Pigeot, N. (1973). Analyse typologique d'une série de 163 pointes du Tardenois. *Cahiers du Centre de Recherches Préhistoriques de l'Université de Paris-I*, 1, pp. 19-29.
- Rozoy, J.-G. (1978). Les derniers chasseurs. *L'Épipaléolithique ("Mésolithique") en France et en Belgique*. Essai de synthèse. Charleville.
- Rozoy, J.-G. (1980). La délimitation des groupes humains à l'Épipaléolithique. *Bulletin de l'Association Liégeoise pour la Recherche Archéologique*, XIV, 35-41.
- Rozoy, J.-G. (1988a). Le Magdalénien en Europe: démographie, groupes régionaux. *Bulletin de la Société Préhistorique du Luxembourg*, 10, 139-158.
- Rozoy, J.-G. (1988b). Le Magdalénien supérieur de Roc-La-Tour I. *Helvëtica*, XXVVI, 157-170.
- Rozoy, J.-G. (1989a). Roc-La-Tour I et la démographie du Magdalénien. in: Otte, M. (ed.), *Le Magdalénien en Europe*. Actes du Colloque de Mayence 1987, pp. 81-100. Université, Liège.
- Rozoy, J.-G. (1989b). The Revolution of the Bowmen in Europe. in: Bonsall, C. (ed.), *The Mesolithic in Europe*, pp. 13-28. Edinburgh University, Edinburgh.
- Rozoy, J.-G. (1990). La Roche-à-Fépin et la limite entre le Tardenoisien et l'Ardennien. in: Vermeersch, P. and Van Peer, P. (eds), *Contributions to the Mesolithic in Europe*, pp. 413-422. University, Leuven.
- Rozoy, J.-G. (1991a). La délimitation des groupes humains préhistoriques. Bases typologiques et géographiques. *Colloque de Beaufort 1990*, *Bulletin de la Société Préhistorique du Luxembourg*, 12, 65-85.
- Rozoy, J.-G. (1991b). Nature et conditions de la néolithisation. La fin de l'Épipaléolithique ("Mésolithique") au nord de la Loire. In: *Mésolithique et néolithisation en France et dans les régions limitrophes*, pp. 403-423. CTHS, Paris.
- Rozoy, J.-G. (1992a). L'évolution en mosaïque. *Bulletin de la Société Préhistorique Française* 89 (1), 19-25.
- Rozoy, J.-G. (1992b). The Magdalenian in Europe. *Demography, regional groups*. *Préhistoire européenne - European Prehistory*, 1 (Liège), 67-82.
- Rozoy, J.-G. (1992c). Le propulseur et l'arc chez les chasseurs préhistoriques. *Techniques et démographies comparées*. *Paléo*, 4, 175-193.
- Rozoy, J.-G. (1992d). Le montage des armatures sur les flèches épipaléolithiques. *Revue Archéologique de l'Est*, 161, 29-38.
- Rozoy, J.-G. (1993a). Les problématiques successives de l'Épipaléolithique ("Mésolithique"). *Bulletin de la Société Préhistorique Française*, 340-351.
- Rozoy, J.-G. (1993b). Les archers épipaléolithiques: un important progrès. *Contribution à l'histoire des idées sur la "période de transition"*. *Paléo*, 5, 263-279.
- Rozoy, J.-G. (1994a). Techniques de délimitation des cultures épipaléolithiques: la Culture de la Somme. in: Pion, G. (ed.), *Mésolithique entre Rhin et Méditerranée*, pp. 85-100. A.D.R.As.Chambéry.
- Rozoy, J.-G. (1994b). Evolution récente du cerveau humain. In: *Colloque "Nature et Culture"*, Liège Univ., pp. 1007-1042.
- Rozoy, J.-G. (1994c). Séjours d'été en Ardenne des Magdaléniens du Bassin parisien. In: *Le Paléolithique supérieur de l'Est de la France*, Table ronde de Chaumont, *Mém. S.A.C.* 13 Reims, pp. 139-156.
- Rozoy, J.-G. and Slachmuylder, J.-L. (1990). L'Allée Tortue à Fère-en-Tardenois (Aisne, France), site éponyme du Tardenoisien récent. in: Vermeersch, P. and Van Peer, P. (eds), *Contributions to the Mesolithic in Europe*, pp. 423-434. University, Leuven.
- Schmider, B. (1994). *Marsatij*. Université, Liège, service de Préhistoire (E.R.A.U.L. 55).

- Service, E.R. (1968). *The hunters*. Foundation of Modern Anthropology Series, Prentice Hall, London.
- Service, E.R. (1971). *Primitive Social Organisation. An Evolutionary Perspective*. Random House, New York.
- Sonneville-Bordes, D. de (1966). L'évolution du Paléolithique supérieur en Europe occidentale et sa signification. *Bulletin de la Société Préhistorique Française*, LXVI, 3-34.
- Straus, L.G. (1992). To change or not to change. *The Late and Postglacial in Southwest Europe*. *Quaternaria* Nor:a, v, 161-185.
- Straus; L-G- (1993). Upper Paleolithic Hunting Tactics and Weapons in Western Europe. in: Peterkin, G., Bricker, H. and Mellars, P. (eds), *Hunting and Animal Exploitation in the Late Paleolithic and Mesolithic of Eurasia*, *Archeol. Papers of the American Anthropol. Association* No. 4, pp. 83-93. Washington.
- Straus, L.G. and Otte, M. (1995). Stone Age Wallonia (Southern Belgium). *Current Anthropology*, 36(5), 851-854.
- Street, M. (1994). Faunal succession and human subsistence patterns in the Rhineland 13,000 --9000 B.P. In: *Chronostratigraphie et environnement des occupations humaines du Tardiglaciaire et du début de l'Holocène en Europe du Nord-Ouest*, résumés, p. 303, CTHS, Paris.
- Taborin, Y. (1992). Les espaces d'acheminement de certains coquillages magdaléniens. in: Otte, M. (ed.), *Le peuplement magdalénien*, colloque de Chancelade 1988, pp. 417-429. CTHS, Paris.
- Taborin, Y. (1993). La parure en coquillage au Paléolithique. XXIX^e, supplément à *Gallia-Préhistoire*, Centre National de la Recherche Scientifique, Paris.
- Taborin, Y. (1994). La question de l'unité territoriale. In: Taborin, Y. (ed.), *Environnements et habitats magdaléniens. Le haut-entre du Bassin parisien*, pp. 180-182. *Documents d'Archéologie Française*, Paris.
- Taute, W. (1968). Die Stielspitzengruppen im nordlichen Mitteleuropa: ein Beitrag zur Kenntnis der späten Altsteinzeit. *Fundamenta*, Reihe A, Band 5. Xv. Böhlau, Köln.
- Thevenin, A. (1976). Les civilisations du Paléolithique supérieur en Lorraine et en Alsace. In: Lumley, H. de (ed.), *La Préhistoire Française*, Tome 1/2, pp. 1361-1363. Centre National de la Recherche Scientifique, Paris.
- Thevenin, A., Guillot, G. and Guillot, O. (1989). Le gisement épipaléolithique à galets gravés du Poirier la Vierge à Neuville-sur-Omain, canton de Revigny-sur-Omain (Meuse). In: Aimé, G. and thevenin, A. (eds), *Epipaléolithique et Mésolithique entre Ardennes et massif alpin*, Table ronde de Besançon 1986, pp. 51-66. SALSA, Vesoul.
- Vanetti, J.-L. and thevenin, A. (1989). Le gisement épipaléolithique de l'Atthey à Magny-Vernois, canton de Lure (Haute-Saône). In: Aimé, G. and thevenin, A. (eds), *Epipaléolithique et Mésolithique entre Ardennes et massif alpin*, Table ronde de Besançon 1986, pp. 75.-87. SALSA, Vesoul.
- Vermeersch, P. (1984). Du Paléolithique final au Mésolithique dans le Nord de la Belgique. In: Cahen, D. and Haesaerts, P. (eds) *Peuples chasseurs de la Belgique préhistorique dans leur cadre naturel*, pp. 181-193. Institut Royal des Sciences Naturelles de Belgique, Bruxelles.
- Violot, J.-M. (1994). Le Mésolithique en Bourgogne et le Beaugencien. In: Pion, G. (ed.), *Mésolithique entre Rhin et Méditerranée*, pp. 125-134. A.D.R.As., Chambéry.
- Wilson, Th. (1900). Classification des pointes de flèches, des pointes de lances et des couteaux en pierre. In: XII^e Congrès International d'Anthropologie et Archéologie Préhistorique, pp. 455-460, Paris.
- Ziezare, P. (1989). Identification et cadre chrono-culturel du Mésolithique ancien: le gisement de plein-air d'Altwies-Haed, Luxembourg. In: Aimé, G. and thevenin, A. (eds), *Epipaléolithique et Mésolithique entre Ardennes et massif alpin*, Table ronde de Besançon 1989, pp. 31.-50. SALSA, Vesoul.