

1.1. RIVERS AS ORIENTATION AXES FOR MIGRATIONS, EXCHANGE NETWORKS AND TRANSMISSION OF CULTURAL TRADITIONS IN THE UPPER PALAEOLITHIC OF CENTRAL EUROPE

Résumé

Les grands réseaux fluviaux ont joué un rôle important comme axe d'orientation pour les chasseurs-cueilleurs du Paléolithique supérieur en Europe. Nous illustrons cette hypothèse par des observations sur la dispersion de la matière première lithique le long des systèmes de rivières importants, c'est-à-dire le Danube, le Rhin et le Rhône. La mobilité humaine et la présence des systèmes d'échanges régionaux permettent le mouvement d'artefacts lithiques, de matières premières et d'éléments de décoration personnelle. Ces résultats sont examinés par l'étude et la comparaison des éléments de l'art mobilier et pariétal à la période glaciaire.

Abstract

Major river systems played an important role as orientation axes for European Upper Palaeolithic hunter-gatherers. We illustrate this hypothesis by observations on lithic raw material dispersal along major rivers systems, i.e. The Danube, the Rhine and the Rhône. Human mobility and the presence of supra-regional exchange systems led to the move of lithic artefacts, raw material contingents and elements of personal decoration. These results are tested by the study and the comparison of elements of Ice Age mobile and parietal art.

Keywords: Europe, Upper Palaeolithic, lithic raw material, embedded procurement, migrations, exchange systems, Danube, Rhine, Rhône

1 – Introduction

This paper discusses the hypothesis if major river systems could have played a decisive role as orientation axes for mobility and exchange for the first anatomically modern humans dispersing into Europe. We are completely aware that this hypothesis can only be one aspect in a complex system of factors influencing human behaviour, but we do think that this aspect had measurable influences on the human activities. As we discuss in other papers (Floss 2000b; Hussain & Floss 2012, Hussain & Floss, in preparation), these observations are not the same all over the European Upper Palaeolithic, because we see important chronological differences. The Early Upper Palaeolithic, particularly the Aurignacian, is marked by the dispersal of anatomically modern humans into Europe and therefore rivers, for instance the Danube, nearly automatically play this role as a focal system. Contrary to that, the Middle Upper Palaeolithic procures the impression that different cultural entities now had been formed and that rivers could play a certain role as boundary between these entities. The eastern limits of the Solutrean along the river Rhône in France can be seen as a striking example for this kind of observation. After the late glacial maximum, in terms of the Late Upper Palaeolithic, particularly in the evolved Magdalenian, migrations in formerly uninhabited areas took place and exchange systems over long distances attained their maximum. Given this background, rivers regained an important role as orientation axes, as it shows for instance the presence of Mediterranean mollusc beads in Central European Magdalenian sites (Floss 2000b).

2 – Humans and the use of rivers

Generally spoken, the major European river systems of today existed already in the course of the last glacial period, apart from the fact, that the European land mass was widely extended due to the lower sea-level. The major rivers flowing into the Atlantic Ocean or the Mediterranean Sea, consequently were a little longer than today. Another aspect concerns the continued Holocene sedimentation of river valleys which made late Pleistocene river valleys, at least in mountainous areas, much deeper than they are today. Drillings at the valley bottom of tributaries of the river Danube in the Swabian Jura showed for instance post-Pleistocene sedimentation rates achieving 10

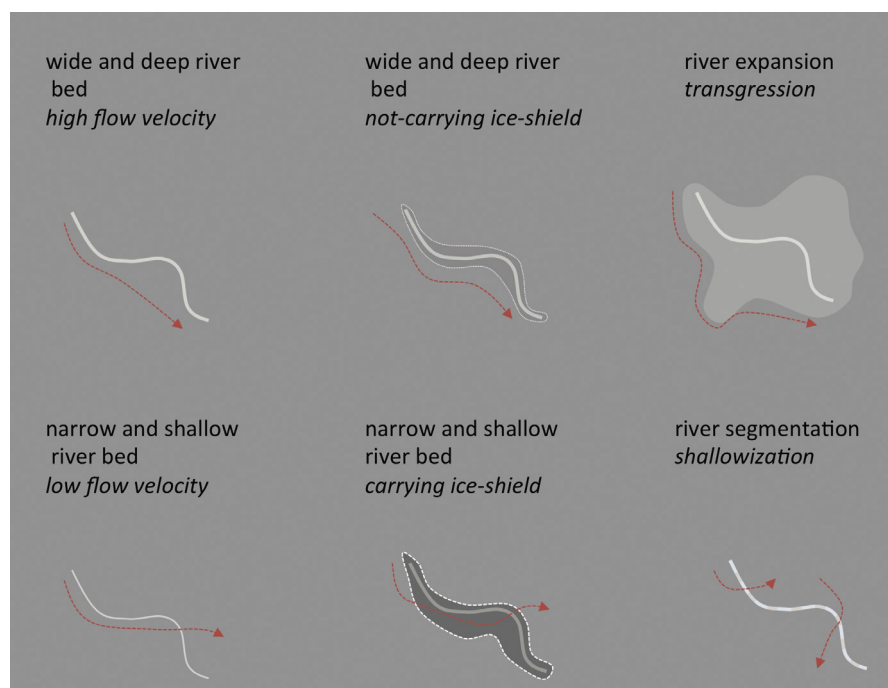


Figure 1
Pleistocene river types in Central Europe
(Hussain & Floss 2012)

to 15 meters. Rivers were very important for Palaeolithic people not only in terms of communication but as well in terms of basic needs of subsistence. Rivers and their banks yielded water, fish, waterfowls, molluscs, edible plants, big game using rivers as drinking place or crossing the rivers at fords. Rivers yielded as well diverse raw materials, for instance pebbles for the lithic production, hammer stones, other tools and housing construction or many vegetable raw materials, so as reed or cattail. On the whole, it is not at all astonishing that the majority of the Upper Palaeolithic sites in Central Europe is situated in the direct vicinity of big rivers (Floss 2003a). To which degree, rivers could then have been used as orientation axes, ford passage or even means of fluvial transport, depends on many factors, which are for instance the regional geological and geographical setting, stream velocity, but as well general climatic conditions and seasonal oscillations. Generally, different scenarios are possible (Fig. 1). Rivers could be crossed when they were slow, with shallow water, carrying an ice sheet or were segmented. They could not be crossed if the river was wide and/or deep, had high flow velocity, was not carrying an ice sheet or was expanded due to floodwaters. In terms of residential mobility, the elevated plains flanking the river valleys were much more convenient to move than the valley bottom barely penetrable due to the thicket, morass and the presence of insects and snails, particularly in the summer.

3 – Hunter-gatherers, mobility and exchange

One of the major possibilities to reconstruct Palaeolithic hunter-gatherer territories and migrations, consists in detecting the origins of lithic raw materials. In the uniform and open European ice age landscape, residential mobility rates were high and lithic materials were mainly embedded (according to L. Binford) within these residential moves. In some exceptional cases, we cannot exclude a direct procurement in order to obtain materials of a particularly high quality. An important problem is to distinguish embedded procurement and exchange. If we plot, in a broader European scale the distances between the Palaeolithic sites and the raw material outcrops (Floss 1994, 326), the graph clearly declines at about 100 to 150 km. Beyond this range, only very few single objects, mostly tools, blades or bladelets occur. In contrast, if we plot the distances of objects of personal decoration, as mollusc shells or fossils (Floss 1994, 337), we observe partly very high distances exceeding several hundreds of kilometres. In this case, in our point of view only complex exchange systems can be responsible for these high distances. According to stone artefacts and their raw materials we conclude, that materials of an origin inside 150 km were probably transported in the context of residential moves. Nevertheless, in this scale we cannot exclude exchange. In contrast,

if distances go beyond this range of 150 km, we consider that these distances cannot anymore be explained by simple migrations inside the own group territory but by exchange of single objects or, in rare cases, of raw material contingents.

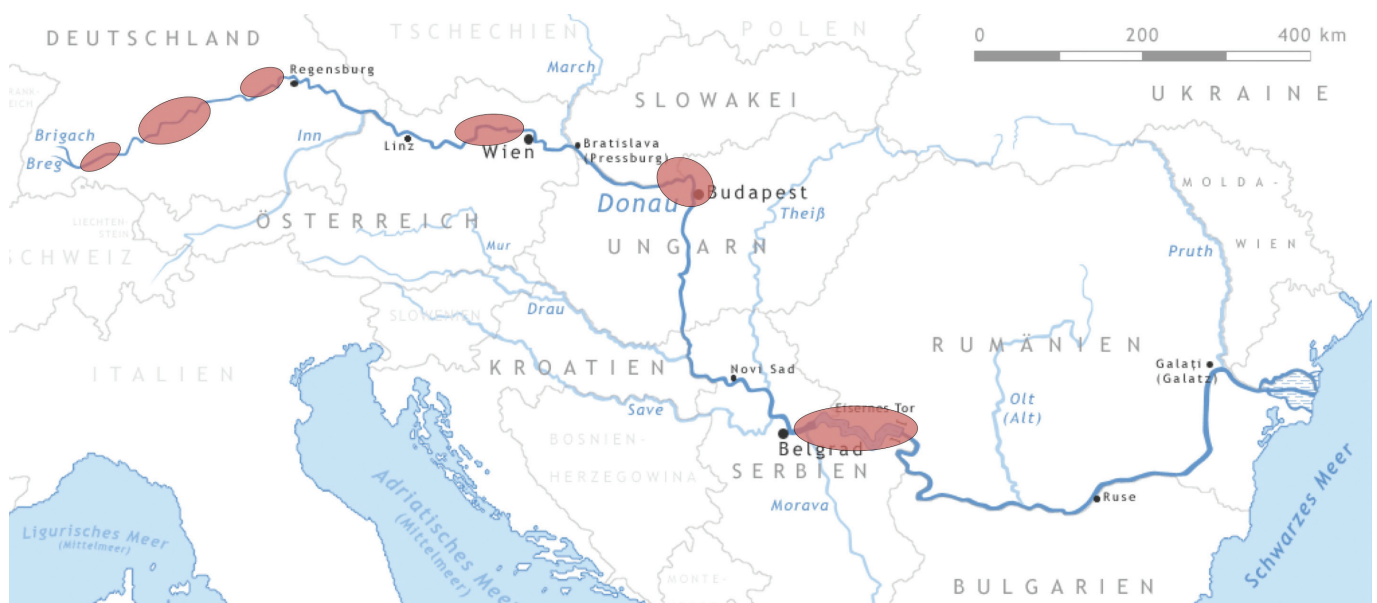
4 – Raw material identification methods

Concerning raw material identification, we use mainly a system of macroscopic characteristics which has been developed over the last 25 years (Floss 2012). Colour, colour distribution, grain size, gloss, inclusions, cortex, nodule size and shape, all these criteria allow in many cases an accurate identification. If these methods come to their limits, microscopic observations or trace element analysis can be applied. A very important archaeological method to identify at least approximately the distance to the raw material origins, is the chaîne opératoire – method. Since their exploitation at the outcrop, lithic materials are continuously transformed and reduced within the human migrations and settlement cycles. In other words, the more the material is distant from the outcrop, the more these materials get scarce and are only represented by single pieces, mostly blades, bladelets or tools. Many studies could clearly establish this relation, c.f. in the Rhineland (Floss 1994) or in southwest Germany (Burkert & Floss 2006).

5 – Nature, culture and rivers

For prehistoric hunter-gatherers, landscape is an important factor conditioning their activities. As a part of the surrounding environment, the landscape as perceived by Palaeolithic hunter-gatherers is always both a natural as well as a cultural phenomenon (Descola 2011). In other words, space is not only something naturally given, but also something culturally inherited. As soon humans are involved, the ideal natural space vanishes, giving rise to the cultural space of landscape. These landscapes were always structured with tracks, pathways and semantic places embedded in the natural environment. The main river courses of the Upper Pleistocene were important focal points of these landscapes and mirror the interconnection of nature and culture. Palaeolithic hunter-gatherers therefore might have conceptualized their entire land use practices in relation to them. Beyond that, assuming an animism-like system of belief, we can expect rivers to become important semantic places which structure the landscape and help mapping it. As illustrated by many ethnographic, but as well prehistoric examples, rivers and particularly big streams can take the role of axes for migrations, but as well as boundaries of different territories. In view of these observations, I would like to explore the role of focal rivers as axes of orientation, taking the examples of three major river systems of central Europe, those of the Danube, the Rhine and the Rhône.

Figure 2 – Important Palaeolithic and Mesolithic settlement centers along the Danube (from west to east Upper Danube, Swabian Jura, Bavaria, Lower Austria, Danube knee, Iron Gate)



6 – The Danube

With a length of about 2.850 km, the Danube is the second longest river in Europe. The Danube has its source in the German Black forest and leads to the Black Sea in Rumania. This river obviously attracted Palaeolithic and Mesolithic hunter-gatherers. Important occupation areas, so as the Upper Danube, the Swabian Jura, the Altmühl valley, The Wachau in lower Austria, the Danube knee and the region around the Iron Gate, are situated in the immediate vicinity of this river (Fig. 2).

One of the most famous regions of the European Palaeolithic is, without any doubt, the Swabian Jura in southwest Germany. On the base of a Middle Palaeolithic occupation by Neanderthals, and after a short hiatus, occurs the Early



Figure 3 – Set of spectacular examples of Aurignacian mobile art and musical instruments from the Swabian Jura. Left: flute made of a vulture bone, Hohle Fels; top; three animal figurines made of mammoth ivory, Vogelherd; Bottom: female figurine made of ivory, Hohle Fels. Photos: J. Lipták & H. Jensen, assemblage Ch. Hoyer

Upper Palaeolithic (Aurignacian), related with an astonishing radiocarbon record yielding very early dates older than 40.000 cal. BP (Higham et al. 2012). As well the Gravettian starts in the Swabian Jura early, i.e. way beyond 30.000 cal. BP. After a hiatus of about 8.000 radiocarbon years, representing the stage of the LGM (Late Glacial Maximum), the evolved Magdalenian occurs with its typical Central European characteristics. Of particular interest is the Aurignacian because it yields examples of the oldest Palaeolithic figurative artworks and musical instruments in the world. In four cave sites situated at two tributary valleys of the Danube, the Ach and the Lone, (Geißenklösterle, Hohle Fels, Vogelherd, Hohlenstein-Stadel) have been discovered, since 1931, about 50 sculptures of humans, animals and hybrid beings, realized mostly out of mammoth ivory, and secondarily out of bone and stone (Fig. 3). Of particular interest was the recent discovery of the so called venus from Hohle Fels, a figurine made of mammoth ivory which had been found in the lowest Aurignacian level of this site and which represents the oldest female representation in the world (Fig. 3). It is interesting that the only other female representation in Aurignacian mobile art of Europe is located at the site of Krems-Wachtberg in lower Austria, as well in the direct vicinity of the Danube (Neugebauer-Maresch 2007). This artistic record of the Swabian Aurignacian is attended by the presence by about eight flutes, made out of mammoth ivory and bird bones (swan and vulture) (Fig. 3). It is again an interesting observation that the only other upper Palaeolithic find spot yielding a flute in Central Europe, certainly 20.000 radiocarbon years younger, is situated at the site of Grubgraben in Lower Austria, which is as well located near to the Danube. The symbolic record of the Swabian Aurignacian is completed by a huge amount of elements of personal decoration (Wolf 2013) which is in number and varieties much more important than in any other Aurignacian find area in Central Europe, may be in overall Europe.

Since the Middle Palaeolithic, the lithic raw material assemblages of the Swabian Palaeolithic sites are dominated by local chert varieties (Çep et al. 2012) and radiolarite. Nevertheless, with the Aurignacian period, starts the increasing presence of Bavarian Jurassic tabular chert, transported to the sites over a distance of about 100 km, underlines the presence of east-west-contacts along the river Danube and its role as major orientation focus (Fig. 4). The very typical Bavarian tabular chert exists in two varieties, the light grey-dark grey striped Abensberg-Arnshofen type and the more homogeneous Baidersdorf type (Böhner 2012). Additionally, some isolated artefacts of a red jasper, the so called Bohnerzjaspis, which is related with only two or three outcrop spots south of the actual city of Freiburg, extend the contacts of the Ach- and Lone valley sites far to the west and confirm the east-west axis. Nevertheless, there are some problems of identification of this material type, as it can be mixed up with local varieties of Bohnerz chert, occurring in the Swabian Jura itself. Ongoing trace

element analysis (Bressy & Floss 2006) tends to resolve this problem. In summary, raw material contacts as well to the west as to the east confirm a high degree of residential mobility along the Danube and bring into contact two major areas of Palaeolithic occupations, that of the Swabian Jura and that of Bavaria (see Uthmeier 2004). On a higher level, these results could even confirm the hypothesis of the colonization of Central Europe along major river systems, i.e. the Danube, recently described as the so called Danube corridor hypothesis (i.e. Conard & Floss 2000, 478), according to which early anatomically modern humans would have used this stream as an important axis of orientation, in the context of their dispersal to Europe.

In the Swabian Gravettian, the use of Bavarian tabular chert and probably of Upper Rhine Bohnerz jasper continues and presents, in comparison to the Aurignacian, significantly higher amounts (Burkert & Floss 2006, Floss & Kieselbach 2006). Again it is interesting to test these lithic results by the artistic record. The only Gravettian female figurines of Central Europe are located immediately near to the Danube: The “red lady” of Weinberghöhlen near Mauern (Altmühl valley, Bavaria) and, of course, the very famous venus of Willendorf (Lower Austria) (Fig. 5). If we add the female figurines of the Moravian sites in the Czech Republic, i.e. Dolni Vestonice, which are also situated not very far from the Danube, the observed recorded is even strengthened.

In the Magdalenian period, the east-west-contacts along the Danube are going on, again demonstrated by a high amount of artefacts made of Bavarian tabular chert (Burkert & Floss 2006). These lithic results are again reinforced by observations concerning the artistic record which are even more striking than the above named Aurignacian and Gravettian examples. We observe striking stylistic similarities between limestone

Figure 4 – Circulation of Upper Palaeolithic lithic raw materials along the Rhine and along the Danube. Red: Aurignacian; Yellow: Gravettian; Blue: Magdalenian (after Burkert & Floss 2006. Basic map Bordon, modified by Ch. Hoyer)

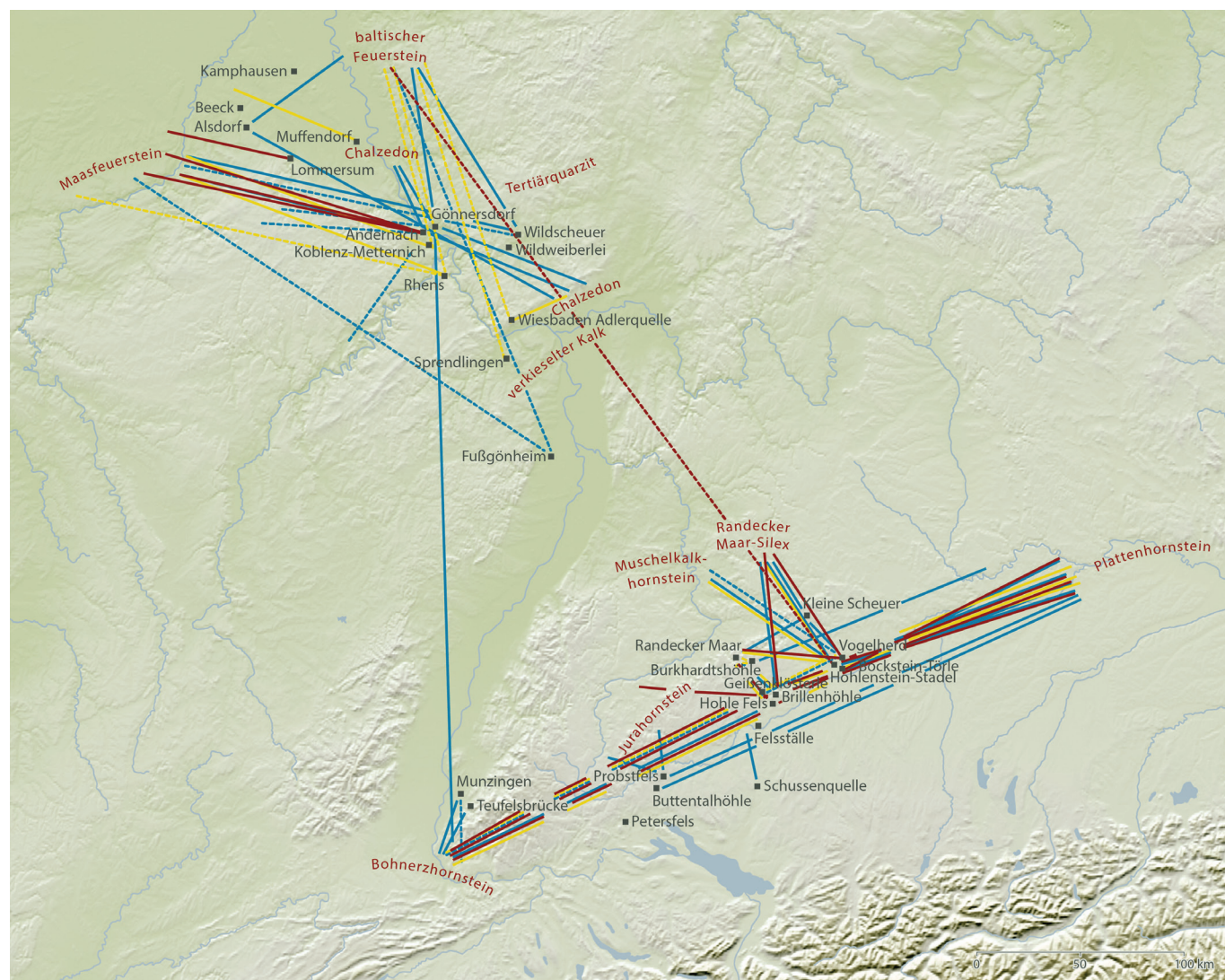




Figure 5 – Aurignacian and Gravettian female figurines along the Danube (from left to right Hohle Fels (Swabian Jura), Weinberghöhlen (Bavaria), Willendorf and Stratzing (Lower Austria))

pebbles and tablets painted with double rows of red dots, which occur in a totally identical type in two cave sites along the Danube and distant of about 100 km: The Hohle Fels in the Swabian Jura and the Obere Klause in the Altmühl valley of Bavaria (Bosinski 1982, Floss & Conard 2001) (Fig. 6). These examples can only be explained by common traditions. The Hohle Fels lithic raw material spectrum contains Bavarian tabular chert whose outcrops are exactly located in the area of the Obere Klause in Bavaria. In this case, direct contact is more than probable.

7 – The Rhine

With a length of 1.240 km, the Rhine belongs to the longest European rivers. Its source is situated in the Swiss Alps and by far the longest part of the river is located in Germany, partly constituting the French-German frontier. The river leads into the North Sea in the Netherlands. The most important Palaeolithic find areas near to the river Rhine are located in the Middle Rhine Neuwied basin and in the Mainz basin. Magdalenian sites in the Neuwied basin, i.e. Gönnersdorf and Andernach, and Gravettian sites in the Mainz basin, i.e. Mainz-Linsenberg and Spredlingen, yield Mediterranean molluscs testifying supra-regional exchange networks (Floss 1990, 1994, 2000b). Gönnersdorf and Andernach represent may be the most spectacular Magdalenian housing structures all over Europe. The artistic record is amazing and contains hundreds of engraved schist “plaquettes”, female figurines and other types of sculptures. The most striking examples of long distance transport of lithics can also be observed in these Magdalenian assemblages (Floss 2000a; 2002a) where respectively some habitations are characterized by west European and some by north European (Baltic) flint (Floss 1994). In contrast, some Gönnersdorf materials point into the south, i.e. a oolithic tertiary chert and a particular type of chalcedony, both originating from the Mainz basin and its surroundings. By far the most striking example of long distance exchange of lithics is testified by three backed elements which had been found in a somewhat younger occupation phase of Gönnersdorf and which have been made of a red jasper whose outcrops are situated about 300 km to the south, near the actual city of Freiburg (Fig. 7). At the Magdalenian site of Götzenhain located east of the Mainz basin, a grey Jurassic chert is also originating from the same geological setting south of Freiburg (Terberger *et al.*, 2013). In summary, it is evident that the river Rhine constitutes in the western part of Germany the same role as an important axis of communication, as it is the case for the Danube in southern Germany.

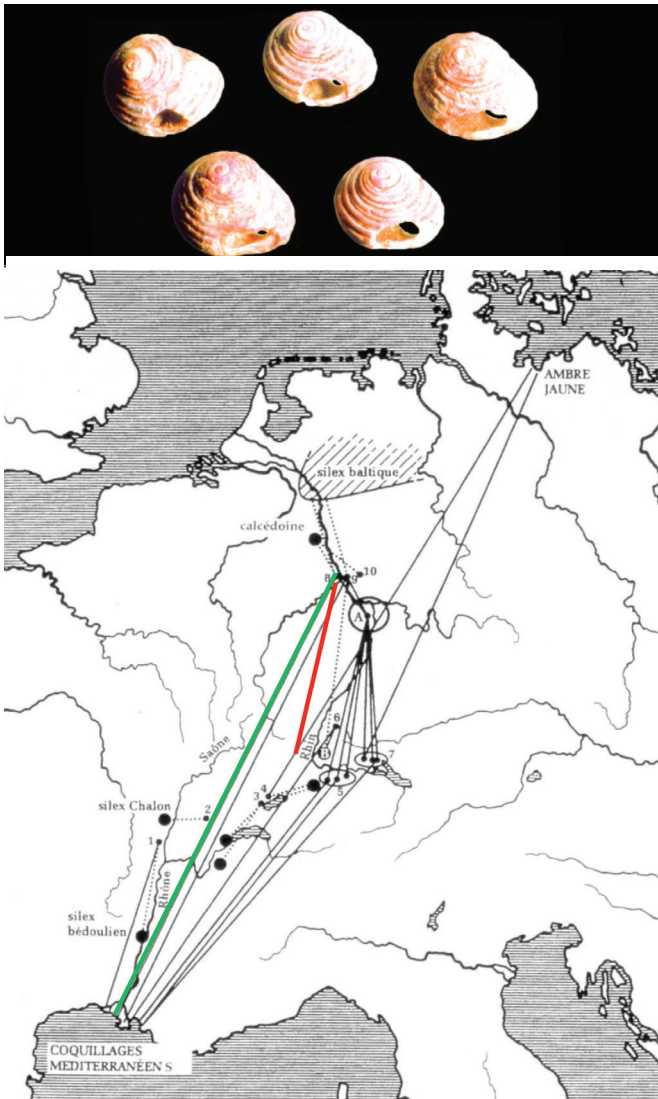
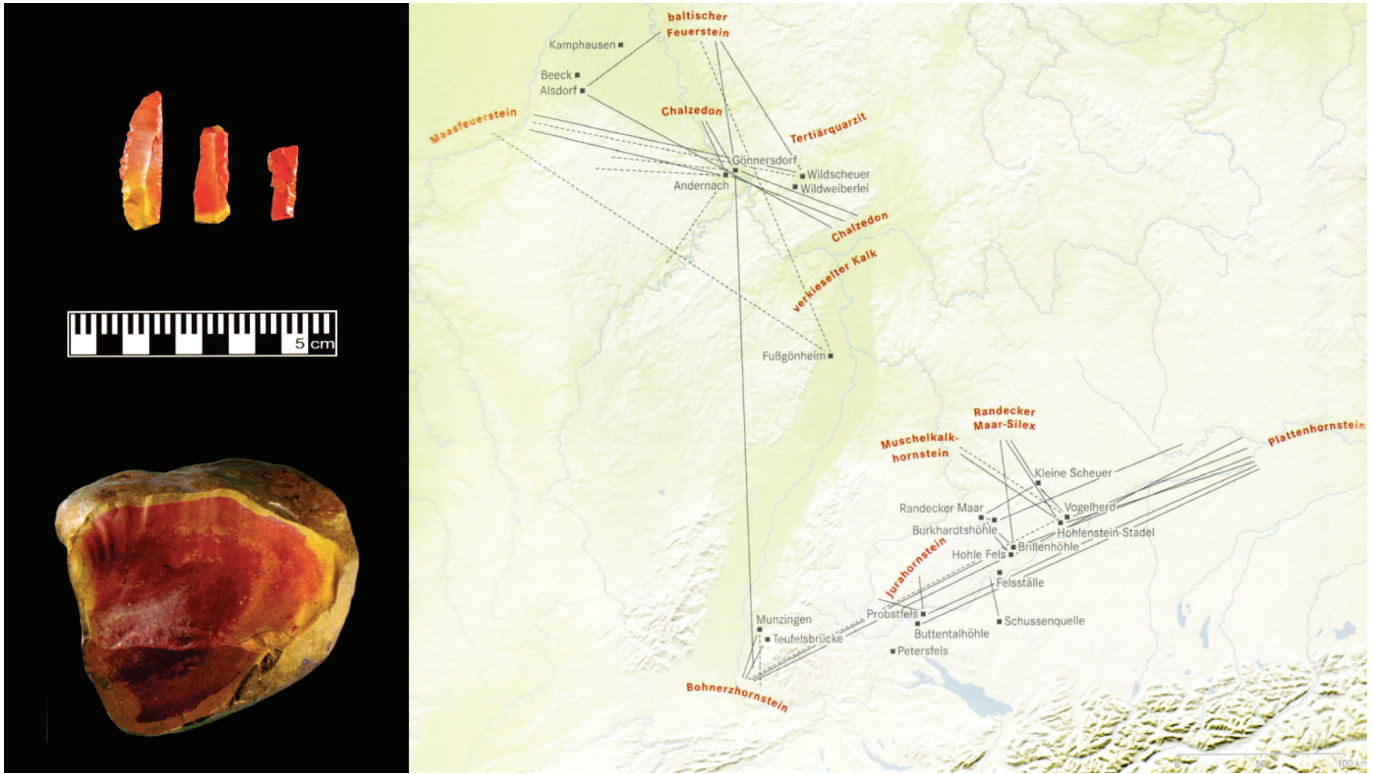


8 – The Rhône

The Saône-Rhône river system in Eastern France is an important landmark for Palaeolithic territories and human migrations (Floss 2002b). In the Late Middle Palaeolithic, the transition zone of Western Europe MtA assemblages and Central Europe KMG assemblages is located in Eastern France in the area of the Saône-Rhône corridor. In the Rhône valley itself, a particular type of Late middle Palaeolithic occurs which is characterized by elongate lithic points. The most eastern Châtelperronian sites, i.e. Germolles and St. Aubin in Burgundy, are situated just at the western banks of the river Saône (Floss 2003b). The Protoaurignacian, initially recognized in Northern Italy and the Mediterranean parts of France, is now more and more identified in regions up the river Rhône, i.e. in Northern Burgundy (Arcy-sur-Cure). Finally, the most eastern Solutrean site at all, is the eponymous site of Solutré, again located only few kilometres west of the river Saône. It is undeniable that the important north-south orientated Saône-Rhône-rift, flanked by mountainous areas with glacial conditions in the Pleistocene, i.e. Massif Central, French Jura, the Alps, is one of the most decisive factors influencing the palaeo-geographic landscape of Western and Central Europe.

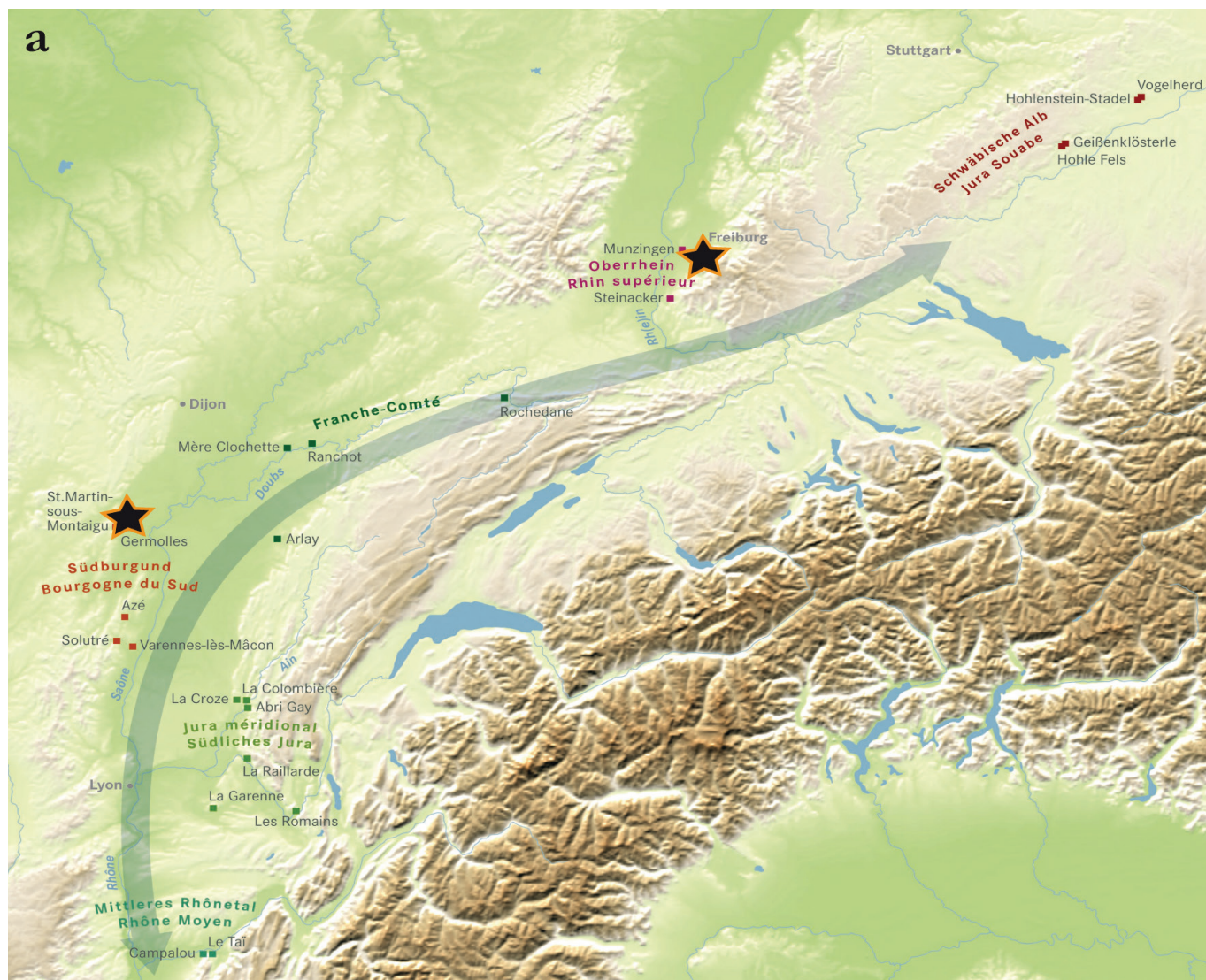
But how can the hypothesis of the Rhine-Saône-Rhône system as major axis of communication be tested? Again, the identification of non-local lithic raw materials and personal ornaments is decisive. As we had already explicated in the context of the river Rhine, the Rhine-Saône-Rhône corridor is marked by the presence of a supra-regional exchange network concerning Mediterranean mollusc shells used for beads, occurring i.e. in Middle Rhine Gravettian and Magdalenian sites (Floss 2000b) (Fig. 8). This record could recently be enriched by the presence of marine mollusc shells in Protoaurignacian sites in southern France (K. Douka, personal comm.). In terms of the lithic record, the southern Burgundy Grottes de la Verpillière in Germolles, excavated since 2006 by the Tübingen team, got, in the course of these last years, more and more into focus. The Germolles site contains two caves. Whereas the grotte de la Verpillière I is known since the 1860ies, the second cave, grotte de la Verpillière II, has been discovered by our team in 2006. Both caves yield deposits dating from the transitional period of the Middle to the Upper Palaeolithic (Micoquian, MtA, Châtelperronian, Aurignacian, Gravettian). In terms of the lithic raw materials, in all levels prevails local flint originating from the so called argiles à silex. In minor portions,

Figure 6 – Very similar Magdalenian painted limestone slabs with double rows of red dots (left Hohle Fels, Swabian Jura), right Obere Klause (Altmühl valley, Bavaria)



occur different varieties of local chert. A particular variety is a black tabular chert whose outcrops are situated in the area of the very important open air site of Saint Martin-sous-Montaigu, located only few kilometres west from Germolles. Also pebbles have been used (quartz, quartzite) originating from terraces of the river Saône its tributary, the Orbize. Very rarely, we observe single artefacts which have been made of non-local materials. The most striking example concerns two artefacts of Aurignacian type from Verpillière I cave: A retouched blade fragment is made, without any doubt, of a pale grey banded Jurassic chert and a typical Aurignacian carinated core is made of a yellow-reddish jasper. Both materials, banded chert and jasper, originate from the same outcrops south of the actual city of Freiburg im Breisgau in the very southwest angle of Germany, at a distance of about 250 km from Germolles (Fig. 9). The Germolles assemblages contain also a smooth banded lacustrine chert, whose outcrops could be situated at the Mont-les-Etrelles in Franche-Comté, representing a destination which would fit perfectly with the general direction of the Saône-Rhine corridor.

The lithic and the mollusc record conveying a clear message, it is again the question how the artistic traditions could eventually confirm the given hypothesis. In this regard, spotlight is put on the Aurignacian ivory sculptures of the Swabian Jura and the parietal art from Grotte Chauvet. Both assemblages yield, in type and even in their portion, nearly the same represented animal species, dominated by mammoth, lion and horse (Fig. 10). These associations are seemingly typical for Aurignacian art, whereas in younger contexts other species, i.e. bovids and reindeer, get more important. In summary, it is not at all excluded that the Aurignacian assemblages of the Swabian Jura and Grotte Chauvet share, at least in a broadly defined sense, common cultural traditions. Without the Rhine-Saône-Rhône corridor as a major axis for migrations and exchange, these observations of a common cultural heritage seem to be completely impossible.



Left

Figure 7 – Three backed artifacts made of red jasper at Gönnersdorf (southwest corner, final palaeolithic). The raw material is originating from outcrops south of the city of Freiburg im Breisgau, about 300 km from Gönnersdorf (data from Floss 1994)

Figure 8 – The Rhine-Saône-Rhône axis illustrated by Mediterranean mollusk shells found in Gravettian and Magdalenian sites in Central Europe (data from Floss 1994, 2002b)



Above

Figure 9 – Circulation of lithic raw materials along the Rhine-Saône-Rhône axis, illustrated by two artifacts from the Grotte de la Verpillière I at Germolles (Burgundy), left: Carinated core (Aurignacian) made of a red - yellow jasper and a sample from its probable outcrop near the city of Freiburg; right: retouched blade (probably Aurignacian) from a banded grey chert and a sample from its probable outcrop, also near the city of Freiburg.

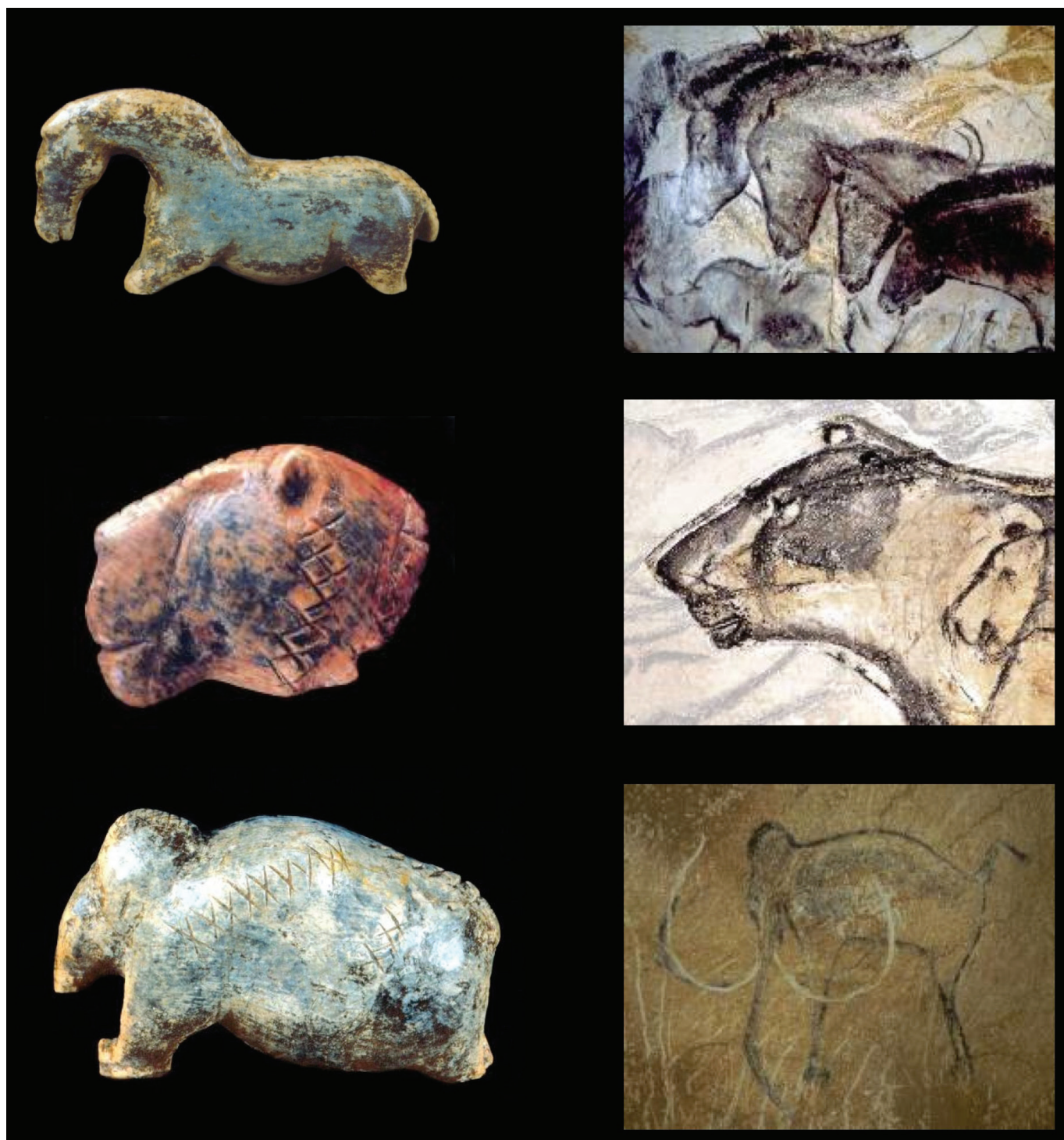


Figure 10 – Representations of parietal art from Grotte Chauvet-Pont d'Arc and from portable art from the Swabian Jura in comparison (Photos DRAC Rhône-Alpes and University of Tübingen, Hile Jensen)

9 – Conclusions

Rivers bear a great potentiality in being coordination features for Palaeolithic hunter-gatherers. They are constitutive elements of Upper Palaeolithic hunter-gatherer societies and an integral part of their cultural landscape. Understanding the role of focal rivers in Palaeolithic land use patterns requires a careful exploration of their specific natural and cultural characters. It was the aim of this paper to test these hypotheses by three examples of major European rivers: The Danube, the Rhine and the Rhône.

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