ISSN: 0514-7336

MAGDALENIAN PERSONAL ORNAMENTS ON THE MOVE: A REVIEW OF THE CURRENT EVIDENCE IN CENTRAL EUROPE

Los objetos de adorno-colgantes magdalenienses en movimiento: una puesta al día de los datos disponibles para Centroeuropa

Esteban ÁLVAREZ-FERNÁNDEZ
Instituto Internacional de Investigaciones Prehistóricas de Cantabria. Unidad Asociada al CSIC. Edif. Interfacultativo de la Universidad de Cantabria. Av. de los Castros, S/N. 39005 Santander (España). Correo-e: estebanalfer@hotmail.com

Recepción: 2008-11-15; Revisión: 2009-02-12; Aceptación: 2009-05-15

BIBLID [0514-7336 (2009) LXIII, enero-junio; 45-59]

ABSTRACT: The Magdalenian is the period in the Upper Palaeolithic in which the greatest number of beads and pendants has been documented. Few sites with levels of this period have not provided examples of this type of artefact. The variety of raw materials used to make them (animal's teeth, marine or fossil molluscs, antler, ivory, etc.) and the decoration on some of them, inform us of contacts between regions remote from each other.

This paper reviews the different types of pendants that have been recorded from Magdalenian sites, with the aim of roughly establishing the network of contacts that existed among the groups of hunter-gatherers in Central Europe. It studies the context in which these artefacts were found, in well recorded stratigraphies at sites researched in recent decades. The study of certain types (marine shells from Atlantic and Mediterranean sources, certain kinds of perforated objects made in jet, such as discs and "Gönnersdorf type" schematic female figures, reindeer teeth sawn off at the alveoli, or discs made from scapulae) enable us to infer the existence of complex networks of long-distance contacts between human groups in the Late Glacial.

Key words: Personal ornaments. Upper Palaeolithic. Magdalenian. Central Europe.

RESUMEN: El Magdaleniense es el periodo del Paleolítico superior en el que se ha documentado un mayor número de objetos de adorno. Están presentes en la mayor parte de los sitios arqueológicos. Se elaboran en una gran variedad de materias primas (dientes de animales, moluscos recientes o fósiles, asta, marfil, etc.). Algunos aparecen grabados. La presencia de estas decoraciones en yacimientos de diferentes regiones europeas nos habla de contactos intergrupales a larga distancia.

En este artículo se hace un recorrido por los diferentes objetos de adorno-colgantes documentados en los yacimientos magdalenienses, con el fin de realizar una aproximación a la red de contactos existente entre los grupos de cazadores-recolectores en el ámbito centroeuropeo. Se estudia el contexto en el que se registran estas piezas dentro de estratigrafías bien conocidas a través de las investigaciones llevadas a cabo en las últimas décadas. El análisis de determinados tipos de objetos de adorno-colgantes (conchas marinas de origen atlántico y mediterráneo, determinado tipo de piezas perforadas realizadas en azabache, como los rodetes y las representaciones femeninas esquemáticas "tipo Gönnersdorf", dientes de reno aserrados a la altura de los alvéolos o rodetes elaborados a partir de escápula) nos permite inferir la existencia de complejas redes de contacto a larga distancia de los grupos humanos durante el Tardiglaciar.

Palabras clave: Objetos de adorno-colgantes. Paleolítico superior. Magdaleniense. Centroeuropa.

1. Introduction

The Magdalenian is without doubt one of the most creative moments in the history of mankind. In comparison with earlier periods, a larger number of sites has been recorded. This increase can be noted in the middle Magdalenian, but it is especially clear in the late-final Magdalenian. The causes for this proliferation of sites are found in environmental factors. Beginning in the middle Magdalenian, the ice sheets progressively withdrew northwards. This made it possible for the expansion of animal populations, and following this, the colonisation by hunter-gatherer groups that until then had occupied lands further south. However, evidence exists showing the presence of these hunter-gatherer groups after the Late Glacial Maximum (Wiesbaden Igstadt, Munzingen, Maszycka, etc.). In the light of the scarce data, and according to the radiocarbon dates, this evidence may be the result of short visits, indicating that the more northern territories were occupied in a more or less occasional way.

From 14000/13500 BP (c. 15500/13500 cal BC)[1] onwards, the signs of colonisation by groups occupying more northern territories becomes more noticeable (Housley, 1998). Certain groups can be defined, settling in the valleys of the Lesse and Meuse, in the Rhine Valley, in the Thüringen Region, in the South of Germany and North of Switzerland, in Moravia and in Poland.

The mobility of the Magdalenian hunter-gatherers in Central Europe can now be proved, thanks to research carried out on the sources of lithic raw materials used for the manufacture of artefacts (Flébot-Augustins, 1997; Floss, 1994; etc). Another kind of evidence for the mobility of these groups comes from decorated objects. One particularly interesting form of engraved portable art is found on artefacts made from bone, antler and ivory. Some of the similar decorations, indicating contacts between Western and Central Europe, are: the presence of *baguettes demi-rondes* decorated with tubercular relief, spear-throwers with sculptured animal heads, and "Gönnersdorf Type" engraved and sculptured feminine figurines (Bosinski, 1982).

[1] The dates cited in this paper have been calibrated with the CalPal2007_HULU curve, using the Program CalPal (Weninger *et al.*, 2007).

2. Evidence for Inter-Groupal Contacts in Central Europe in the Magdalenian: Beads and Pendants

2.1. Raw materials used in Central European sites

Magdalenian personal adornments were made from a wide range of raw materials: shells of recent and fossil molluscs belonging to different species; the different teeth of various kinds of animals; bone, antler and ivory; and mineral materials (Álvarez-Fernández, 2006; Barge *et al.*, 1990; Taborin, 1993). However, this variety in the type of raw material used was not an innovation of the Magdalenian hunter-gatherers, as it already occurred at the start of the Upper Palaeolithic, in the Aurignacian. Nevertheless, the creation of certain forms, the development of certain techniques, and the engraving of decorative motifs that did not exist until then, make it possible to consider the Magdalenian as an original period regarding the manufacture of pendants (Álvarez-Fernández, 2006; Barge *et al.*, 1990; Taborin, 1990, 2004).

— Mollusc shells

At Magdalenian sites in Central Europe, shell beads made from fossil mollusc shells predominate over those made from recent molluscs. The fossil molluscs come from palaeontological deposits more or less near the archaeological sites. This is the case of Belgian sites like Verlaine or Trou de Chaleux, with molluscs from the Paris basin (Dewez, 1987; *cf.* Welter, 2001-2002). From the Mainz Basin come certain molluscs, in particular different species like *Glycymeris* sp., found at Hohlenstien (Kraus, 2001) and Schweizersbild (Nüesch, 1902) in SW Germany, or at Kesslerloch (Heierli, 1907) and Hollenberg-Höhle-3 (Sedlmeier, 1982) in Switzerland. The mollusc shells from a large number of Moravian Magdalenian sites, such as Kůlna, Býcí Skála, Hadí, Adlerova and Pekárna, mainly come from local palaeontological sites, but also from Miocene sediments in the Carpathian Mountains, as well as from the Vienna Basin (Hladilová, 1999). The shells from the Polish site of Maszycka (*Fissidentalium badense* and *Anadara* sp.) were collected at Korytnica, 60 km northeast of the cave (Kozlowski *et al.*, 1993) (Fig. 1).

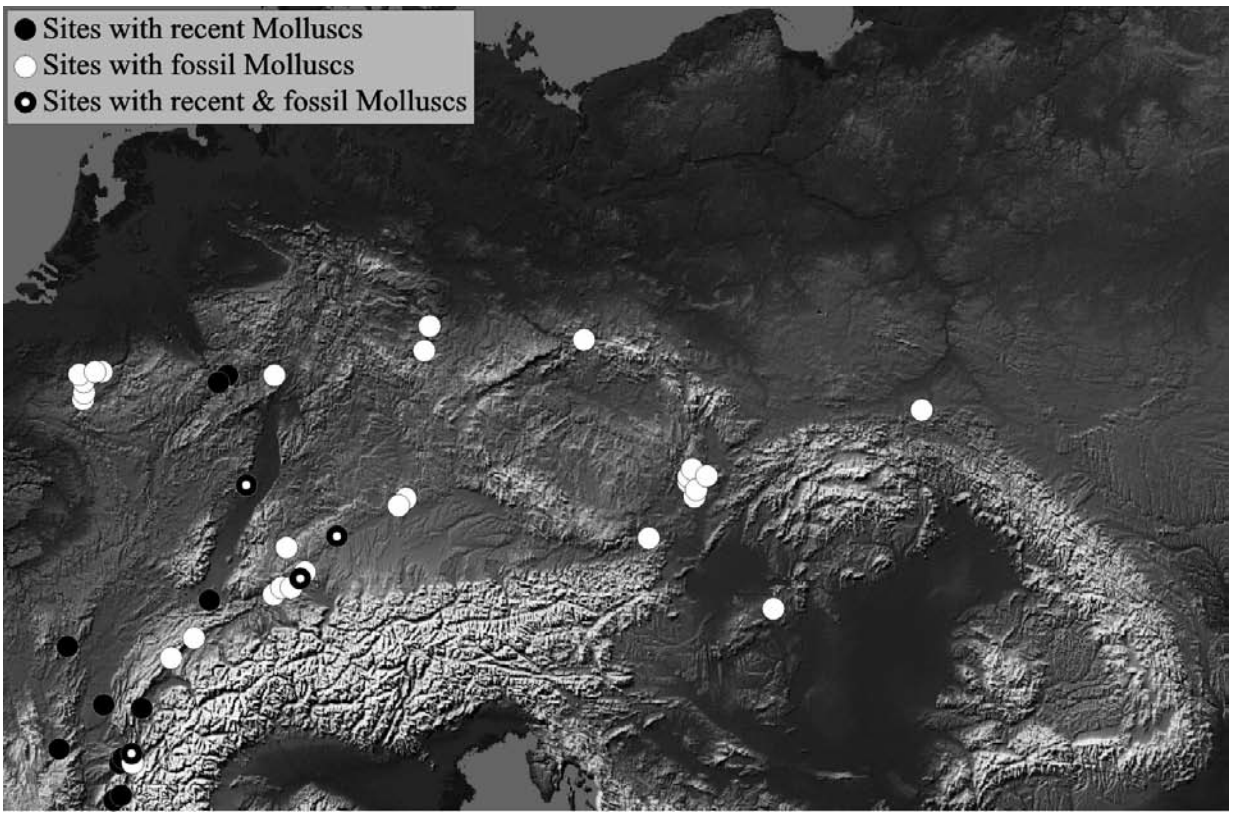

FIG. 1. *Location of Magdalenian sites in Central Europe with pendants made from mollusc shells.*

Equally, it is interesting to point out the examples of perforated *Gyraulus trochiformis* and *Gyraulus sulcatus* shells found at Magdalenian sites in Southern Germany, like Petersfels or Felsställe (Affolter *et al.*, 1994; Rähle, 1987a). These are fossil fresh water snails that come from the middle Miocene deposits in the Tertiary basin of Steinheim, Baden-Württemberg (Heizmann, 1992). These pendants have been recorded at some quite distant sites, e. g. at Neuchâtel-Monruz, 300 km to the south-east of the Steinheim basin (Fig. 2).

Recent molluscs are less frequently present, and they are mainly found in the more western part of Central Europe (at German and Swiss sites). The most common gastropods are the exclusively Mediterranean species *Cyclope* sp. (cf. *C. pellucida*) and *Homalopoma sanguineum*. These two snails appear together at the Rhineland sites of Gönnersdorf and Andernach-Martinsberg-2, as well as at Petersfels. *Cyclope* sp. was also recorded at Höhle Fels, while *Homalopoma sanguineum* was present at Munzingen and Kohlerhöhle. Atlantic gastropods are less common (examples of *Nucella lapillus* found at Gnirshöhle and Munzingen, and *Littorina obtusata* at Höhle Fels). Scaphopods have been found at a few sites, as recent examples of *Antalis* sp were recorded at Andernach-Martinsberg-2 and Gönnersdorf[2] (Álvarez-Fernández, 2001).

— Teeth

The teeth most commonly used to make personal ornaments are the incisors and "incisorform" canines of reindeer, nearly all of them sawn off at the alveole or the incisors. A stone tool was used to saw the

[2] A fragment of an unperforated example of the Atlantic bivalve *Spisula solida* was found associated with one of the hearths at Weisbaden-Igstadt (Terberger, 1998).

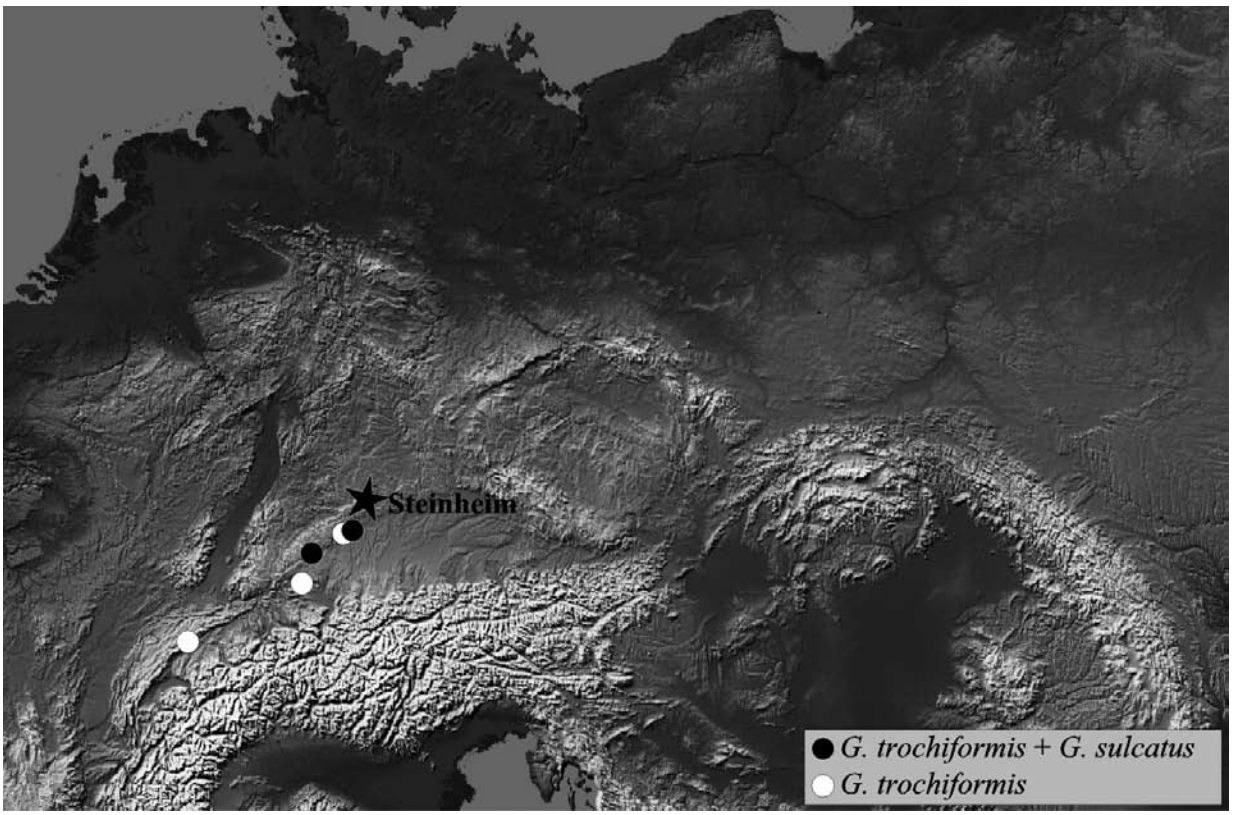

FIG. 2. *Location of Magdalenian sites in Central Europe with pendants made from* G. trochiformis *and* G. sulcatus *shells.*

teeth in the jaw, at the level of the alveolar edge, as far as a certain depth of the root, and then they were broken off by bending. According to F. Poplin, the result of this process was a curved piece made up of a fragment of jaw containing eight teeth (six incisors and two "incisorform" canines) which was then worn as a kind of necklace. This type of pendants has been found at many middle and late Magdalenian sites in Europe, from Las Caldas cave (Northern Spain) to Gönnersdorf (Germany) (Corchón *et al.*, e. p.). The Petersfels site is particularly important, as more than 5000 examples were found there (Poplin, 1983a, 1983b) (Fig. 3). Another way of suspending reindeer incisors was by piercing them, but few examples have been found (e. g. at Munzingen). As well as reindeer incisors, teeth of other animals were pierced in the same way (bovines at Andernach-Martinsberg-2 and Petersfels, and marmot and ibex at the latter site) (Álvarez-Fernández, 2001).

Pierced teeth of other animals are much less abundant. The most common are fox canines (Fig. 4) recorded at sites like Goyet and Trou du Frontal, in Belgium, Kniegrotte and Gönnersdorf in Germany, Schweizersbild and Keslerloch, in Switzerland and Gudenushöhle in Austria (Álvarez-Fernández, 1999, 2006). The incisors and premolars of the same animal were sometimes perforated, but less frequently. The premolars from Gönnersdorf and Andernach-Martinsberg-2 are particularly interesting. The smaller roots of these teeth were removed by sawing or breaking them off, while larger roots were perforated. Their final shape is reminiscent of the "Gönnersdorf type" of feminine figure (Álvarez-Fernández, 1999) so frequently found in rock and portable art, dated in the late and final Magdalenian, all over Europe (Bosinski *et al.*, 2001; Höck, 1993) (Fig 5).

The atrophied canines from red deer also appear at sites such as Trou de Chaleux and Trou de

Frontal, in Belgium, at Gönnersdorf and Höhle Fels in Germany, at Kesslerloch in Switzerland, and at Gudenushöhle in Austria (Álvarez-Fernández, 1999, 2006) (Fig. 6).

The teeth of a few other animals are occasionally found. In Belgium, the use of horse incisors predominates, although there are only four Magdalenian sites with examples of perforated teeth (Verlaine, Goyet, Trou de Chaleux and Trou du Frontal). More unusual objects are horse canines (Trou de Chaleux), wolf canines, premolars and molars (Petersfels), and the canines of bear (Goyet, Trou de Chaleux), of wild boar (Petersfels), of glutton (Schweizersbild) and of bovine (Verlaine, Goyet) (Álvarez-Fernández, 2006).

— Other raw materials of animal origin

The other raw materials of animal origin used in Central Europe during the Magdalenian are bone, antler and ivory (Álvarez-Fernández, 2006). Quite a large number of pendants were made out of animal bones. Hollow bones of birds or mammals, such as hares, were used (bone tubes) and these have been recorded at sites like Andernach-Martinsberg-2 and Petersfels. Reindeer vestigial phalanges (Kesslerloch) and sesamoids (Hostim) were also perforated. Other bones that have been found include hyoid bones (Propstfels, Schweizerbild) and discs made from scapulae with a central perforation, as recorded at sites in Germany (Petersfels), Switzerland (Kesslerloch, Höhlenberg-Höhle-3) and the Czech Republic (Křížowa, Pekárna).

Only a small number of items were made out of deer antler. The most important examples were made by reusing sagaie points. When the spearhead fractured, the bevelled base was perforated, as has been documented at Belgian (Goyet), German (Petersfels) and Swiss (Höhlenberg-Höhle-3) sites. A bone disc found at Nebra and a fragmented object decorated with schematic horses' heads from Petersfels must also be mentioned.

Personal ornaments made from ivory are equally rare. The most important examples are the pieces shaped into the form of animals (such as the hedgehog discovered at Höhle Fels (Germany) or the insect from Coléoptère [Belgium]) or some of their parts (sea urchin spikes from Freudenthal

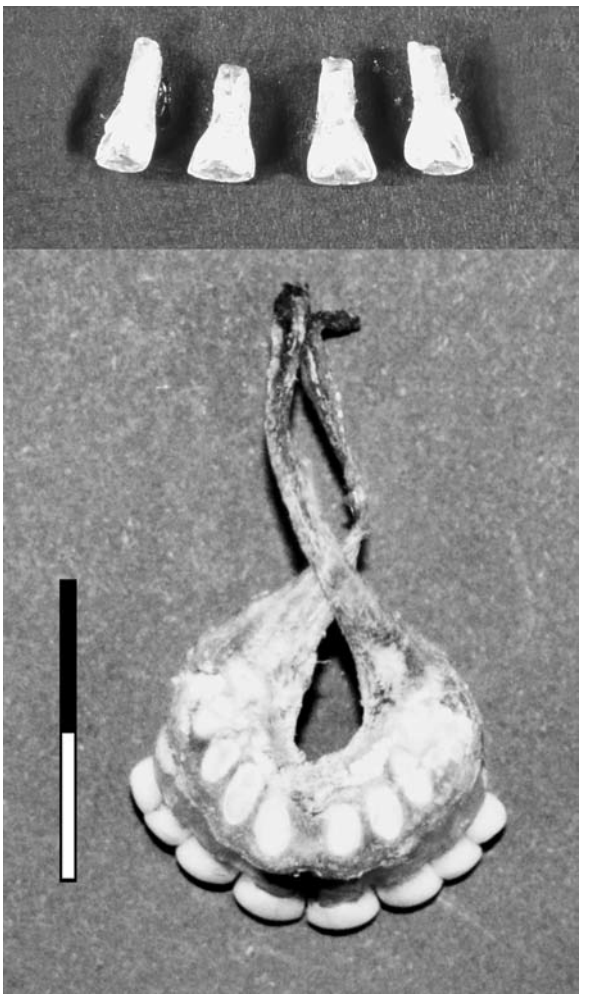

FIG. 3. *Gönnersdorf. Reindeer incisors sawn off at the height of the alveoles. Experimental reconstruction of a necklace made from sawn off reindeer incisors (Foto: Museum Monrepos).*

[Switzerland]). Discs have been recorded (Nebra and Petersfels [Germany]), and also a perforated sagaie point with an anthropormophic figure at Ratirska (Czech Republic), and other objects with complex decoration (plaques from Jankovich [Hungary] and Verlaine [Belgium]).

— Raw materials of mineral origin

Jet was a common raw material for manufacturing pendants in the Magdalenian. A large number of

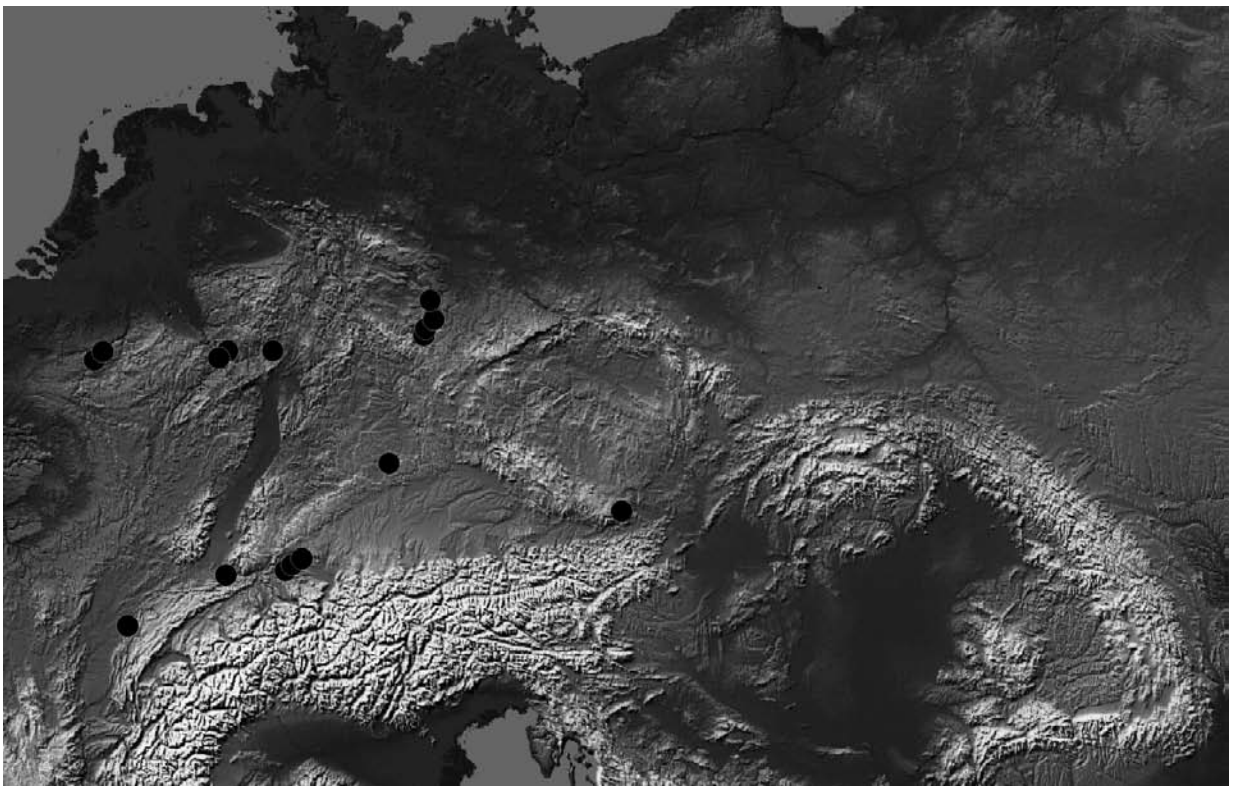

FIG. 4. *Location of Magdalenian sites in Central Europe with pendants made from fox canines.*

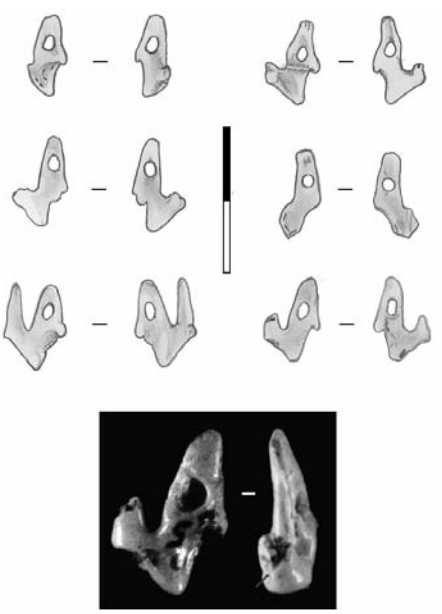

FIG. 5. *Perforated fox premolars from Gönnersdorf and Andernach-Martinsberg-2.*

Central European sites have yielded very small beads (in some cases less than 0.5 mm in size), in various shapes: cylindrical, biconical, spherical, discoid, etc. made out of this organogenic rock. In the case of the German site of Gönnersdorf, it was possible to reconstruct the *chaîne opératoire* of the manufacture of these beads (Álvarez-Fernández, 1999). They are equally abundant at sites in the south of Germany and north of Switzerland, especially in the late-final Magdalenian (Moosbühl, Petersfels [Czech Republic]). Much more carefully worked objects sometimes appear with the beads. Some of the more important are the animal figures (Teyjat, Petersfels) and the imitations of sea urchin spikes (Kesslerloch). Discs and "Petersfels type" feminine figures have been recorded at a group of sites very near each other in SW Germany and Northern Switzerland. The discs appear at Schweizerswild and Kesslerloch, and also at Ochozska. The "Petersfels type" feminine figurines come from sites like Neuchâtel-Monruz and Petersfels (Álvarez-Fernández, 2006) (Figs. 7 and 8).

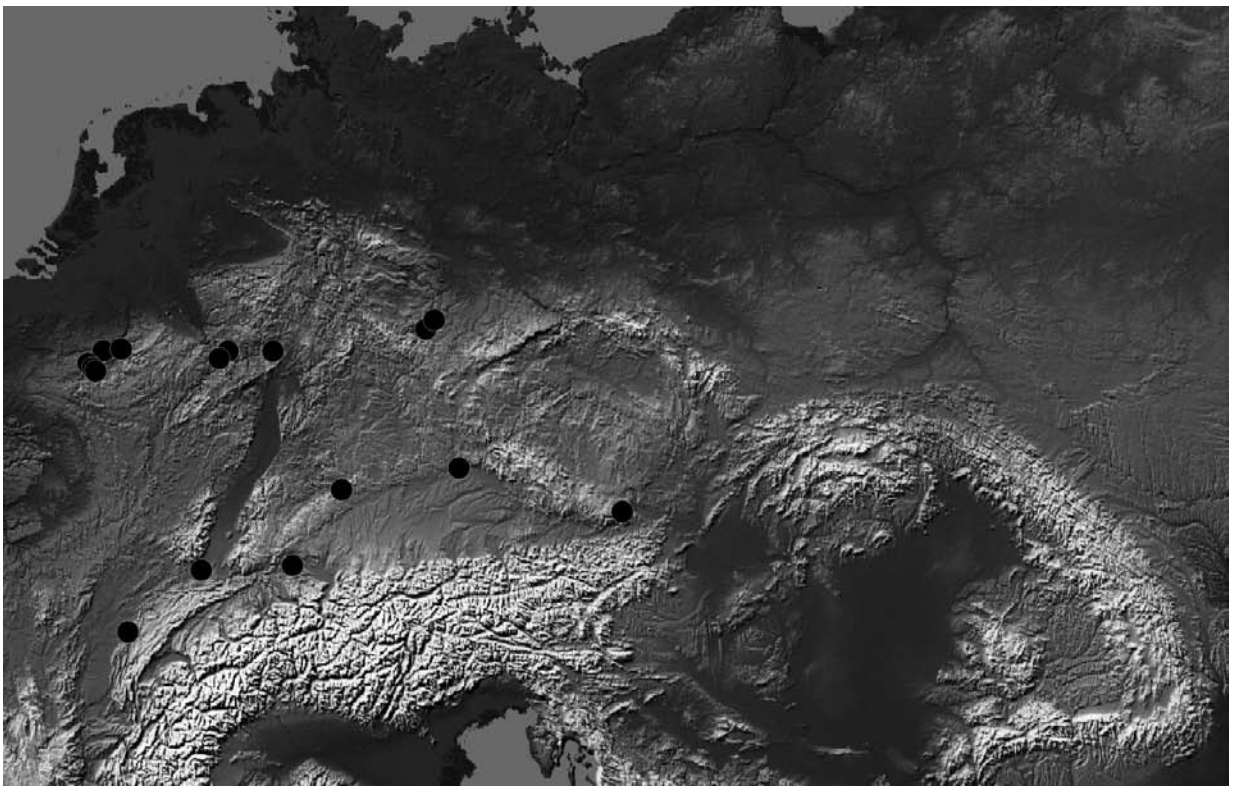

FIG. 6. *Location of Magdalenian sites in Central Europe with pendants made from red deer atrophied canines.*

This raw material is found in geological deposits close to the archaeological sites. This is the case of the Gönnersdorf artefacts, whose raw material probably came from gravel banks in the River Rhine (Álvarez-Fernández, 1999). The most abundant jet deposits are located in the south of Germany and the north of Switzerland (mainly in Hegau and Schaffhausen) (Erisen, 1991).

Among the metamorphic rocks, schist was used to manufacture discs, like those found at Andernach-Martinsberg-2 and Gönnersdorf (some of them decorated with non-figurative motifs). This raw material was found in the immediate area around the sites. However, their use as personal ornaments is doubtful. They may be related with the construction and preparation of habitation structures (Álvarez-Fernández, 1999; Bosinski, 1977, 1981; Terberger, 1997).

Hematite is the most important sedimentary rock to be used. It is found in the form of beads and other pendants which show signs of being scraped to extract ochre dust or to give them a certain shape. Examples were found at Gönnersdorf (Álvarez-Fernández, 1999), at Kniegrotte (Höck, 2000) and at Petersfels (Albrecht, 1979). A sandstone disc was found at Nebra (Mania, 1999).

2.2. The Context of Pendants in Central Europe during the Magdalenian

Research into the contexts of beads and pendants at prehistoric sites, and the elements they are associated with (stone tools, funerary structures, hearth structures, etc.) allow them to be linked to certain activities (of the ritual or funerary kind, in relation with their manufacture, etc.). In order to carry out this research effectively, it is necessary to have archaeological information of a very high quality. Most of the Central European Palaeolithic and Mesolithic sites were dug at the end of the 19th century and in the first half of the 20th century. The techniques used at this time were not usually sufficient to record objects of adornment-pendants,

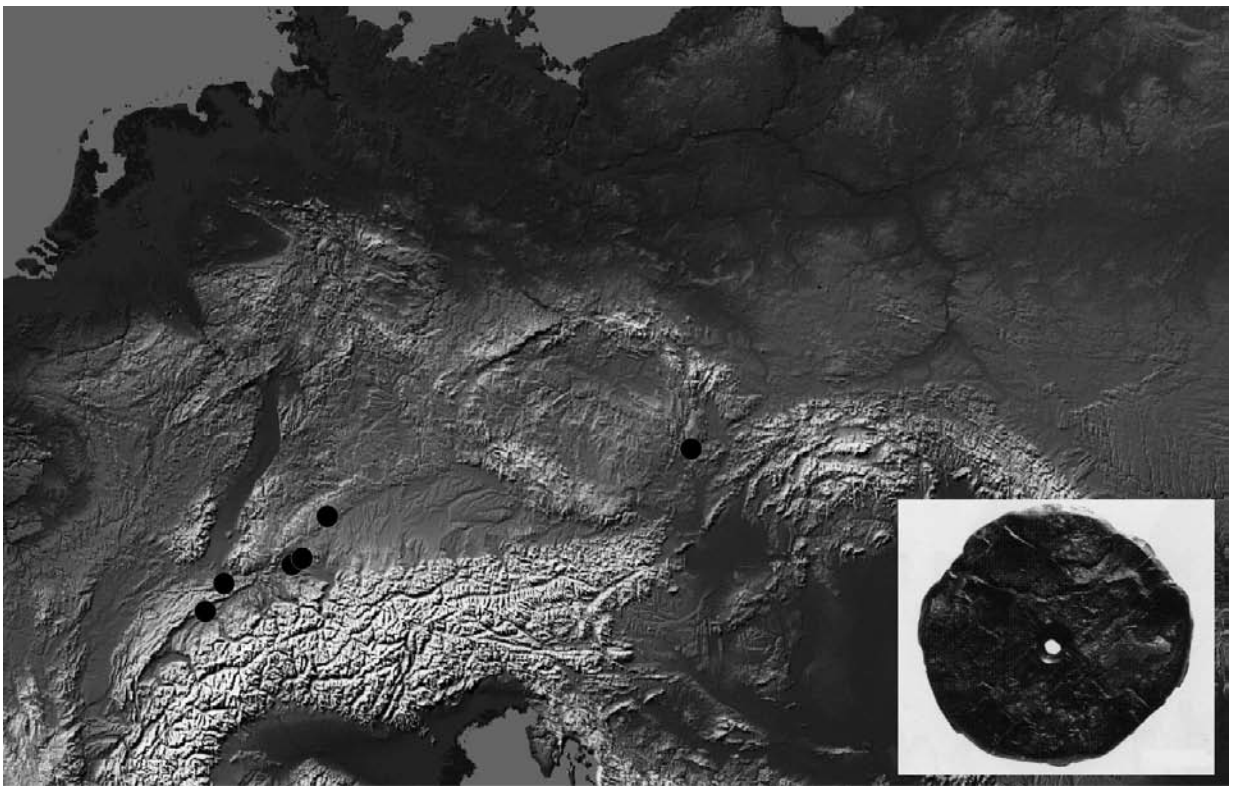

FIG. 7. *Location of Magdalenian sites in Central Europe with discs manufactured out of jet.*

and if they did, they rarely stated which level they came from, and hardly ever gave any information about the part of the site where the artefacts were found or about their association with the other archaeological elements present in the deposit (Álvarez-Fernández, 2006).

Some five hundred personal ornaments, made in various types of raw materials, were found by fine-sieving the spoil heaps left by the excavations carried out at Petersfels at the end of the 1920s (Albrecht, 1979; Albrecht *et al.*, 1994). This should make us think about the large number of artefacts and information about their context that was lost in the course of the old digs in Central Europe.

Most of this kind of objects that have been recorded from archaeological deposits come from "Habitation Layers". That is, they were found in strata formed by remains of anthropic origin (stone or bone artefacts, habitation structures, hearths, etc.) resulting from one or several human occupations, and sedimentation. Possibly, many pendants found in the old digs were associated with artefacts of the same category or of different categories. In the case of modern excavations, most of these objects are found isolated in the deposit, without any apparent context. However, there are occasions when groups of objects have been discovered together, positioned intentionally.

It is very rare to find personal ornaments in the process of being manufactured in Magdalenian habitation layers at Central European archaeological sites. At the open air Magdalenian site of Gönnersdorf, four concentrations were found in which a series of habitation structures were identified, formed by slabs of schist and other rocks, post-holes and pits. Pit 77 in Concentration III was interpreted as an intentional accumulation of artefacts (Terberger, 1997: 217). It was 42 cm in diameter and 12 cm deep. Inside it, there was a considerable number of stone tools (seven burins, 14 borers, a burin-borer, etc.) as well as four needle fragments. In addition, they found over 70 jet fragments, two of which were beards in the process of being manufactured (the perforations were unfinished), five teeth of arctic

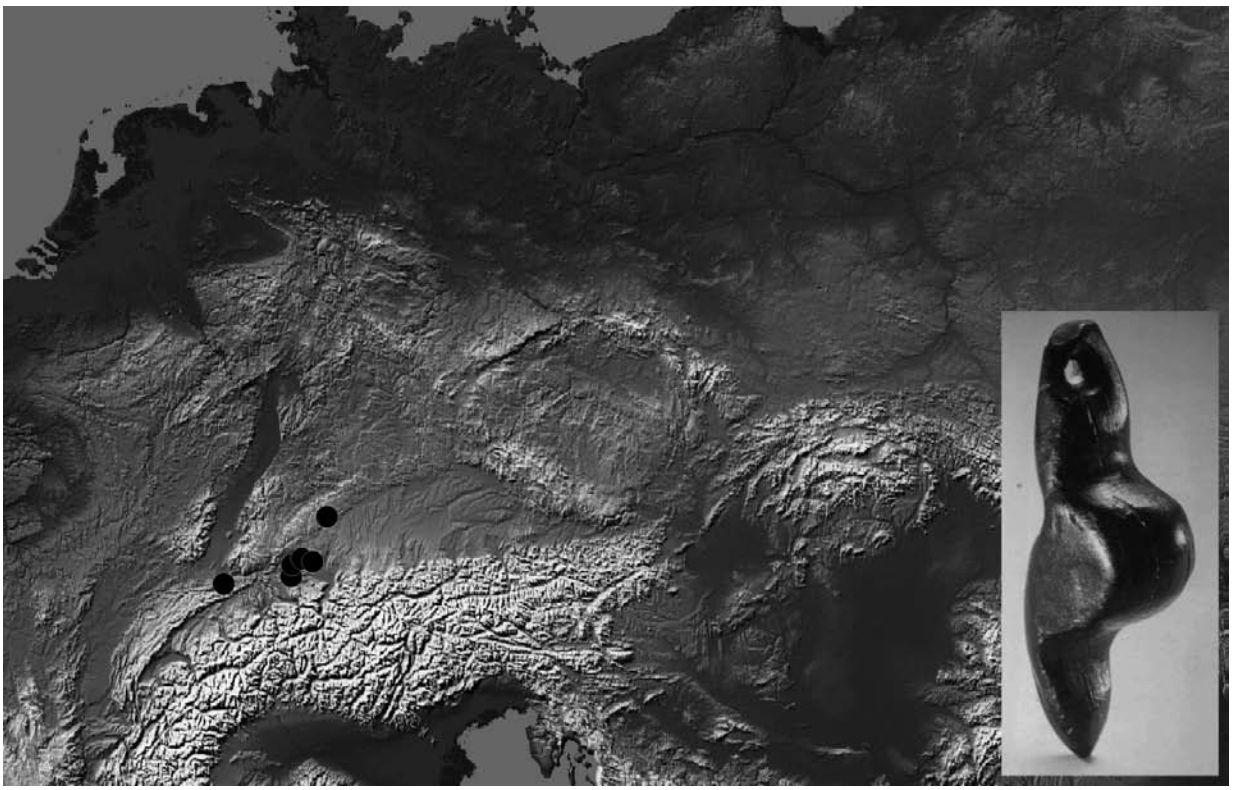

FIG. 8. *Location of Magdalenian sites in Central Europe with "Petersfels type" feminine schematic figures.*

fox, three of them perforated, a fragment of lava with a hole, and schist discs in different stages of the manufacturing process (one completely perforated, three in the course of being perforated, and one perforated and broken in prehistoric times). In my opinion, this was a place connected with the production of artefacts (Álvarez-Fernández, 1999, 2006).

In Pit 19 in Concentration I, a large number of artefacts were found in a sediment rich in pulverised hematite. The pit was 30 cm in diameter and 10 cm deep and was covered by a large schist slab. Inside it they found six perforated atrophied canines of red deer, 38 small beards of different shapes (discoid, rectangular, biconical, etc.) made out of jet, and two perforated teeth of arctic fox. All of these had been used as pendants. This pit has been identified as a deposit in which a necklace had been placed, which was later covered by the remains of a Magdalenian occupation (Bosinski, 1979a: 143). The study of this pieces showed that these items displayed marks of use in their perforations (Álvarez-Fernández, 1999).

This interpretation is equally plausible for some of the shell beads recorded at Andernach-Martinsberg-2. At the bottom of pit 12 in Concentration II at this open-air site, they found a total of 46 examples of *H. sanguineum* and an example of *Cyclope* sp. (cf. *Cyclope pellucida*), as well as lithic remains and mammal bones (horse and arctic fox) (Eickhoff-Cziesla, 1992; Street, 1993) (Fig. 9). To these items, we can add another two of the first of the mentioned species that was recovered from the Magdalenian occupation layer, very near the pit. This has been interpreted as an intentional container of objects (Veil, 1984: 191). Their analysis shows that the perforations in these snail shells had become polished through use (Álvarez-Fernández, 2006).

Another way of obtaining data about the context of the objects is by studying funerary structures. These give us information about the possible goods that accompanied the deceased (their position on the body, the combinations used when making up a necklace, etc.). Further information is based on the use of different raw materials, the place or places

FIG. 9. *Andernach-Martinsberg-2 (Rhineland-Palatinate, Germany). Perforated examples of* H. sanguineum *from Pit 12 (Foto: Museum Monrepos).*

where these were collected, the time needed to make the forms of suspension, the marks of use, etc. A burial represents a closed context; all the personal ornaments in association with it are contemporary with it. However, in practice, this is not always true. To assess these finds correctly, we must be sure that possible post-depositional problems have not been ignored; any factors that might have affected the burial after it had taken place (later secondary burials, bioturbation, etc.). There are two funerary structures in Central Europe traditionally ascribed to the Magdalenian: one in the cave of Mittlere Klause (Bavaria, Germany) and the other at the open-air site of Bonn-Oberkassel (North Rhine - Westphalia, Germany). At the present, the chronology of both burials is debatable[3]. Only the one at Bonn-Oberkassel has a single object: a reindeer incisor with the root sawn off, associated with a vertebra of one of the bodies.

[3] No personal ornaments were found associated with the burial in Mittlere Klause, which was dug by H. Obermaier at the beginning of the 20th century. It has been dated directly (UCLA-1869: 18200 ± 200 BP: 19948 ± 348 cal BC) (Wüller, 1999). The double tomb at Bonn-Oberkassel, discovered in 1914, has been ascribed to the Magdalenian IV in H. Breuil's classification because of the presence of an incomplete *contour découpé* (Bosinski, 1982; Wüller, 1999). The dates taken from the bodies indicate that the burials should be ascribed to the Dryas II (Baales, 2002).

2.3. Convergences and divergences between Magdalenian personal ornaments from Western and Central Europe

The data currently available about personal ornaments from Magdalenian sites in Central Europe indicates that contacts existed with groups located in the Southwest of Europe. The clearest evidence for this is the presence of perforated shells of marine molluscs from the Mediterranean and Atlantic, in areas that are over 600 km from the coasts. The presence of exclusively Mediterranean species, like *C. pellucida* or *H. sanguineum*, has been noted not only in Central Europe but also at Magdalenian sites in Southwest Europe, in the Dordogne, along the Pyrénées and in Cantabrian Spain (Álvarez-Fernández, 2006) (Fig. 10).

The existence of shells of the species *L. obtusata* and *N. lapillus*, which are now typically Atlantic species, could suggest contacts with both coasts, as both of these could have colonised the Mediterranean during the Late Glacial period. However, these recent molluscs have so far only been recorded at the more western sites within Central Europe, located in the basins of the Rhine (Gönnersdorf, Munzingen) and the Upper Danube (Höhle Fels).

The presence of fossil molluscs is more difficult to evaluate, as the same species may appear in several sedimentary basins. It would be logical to suppose that they were procured at the source nearest to the archaeological site. Even so, the classification of these fossil molluscs suggests that long-range contacts existed (Affolter *et al.*, 1994; Flébot-Augustins, 1997; Floss, 1994; Hladilová, 1999; Kozłowski *et al.*, 1993; Lazar, 1974; Rähle, 1983; Sedlmeier, 1982; Welter, 2001-2002).

As regards the teeth, most of the examples come from animals among the species that were hunted for food, as is the case of the reindeer and horse. In the case of the teeth of carnivorous animals, they may have been collected when they were hunted for their skins, or possibly they were taken from the skulls of dead animals. However, red deer is absent from the faunal assemblage of most of the sites (Gönnersdorf, Andernach-Martinsberg-2, etc.) so the presence of their atrophied canines suggests that

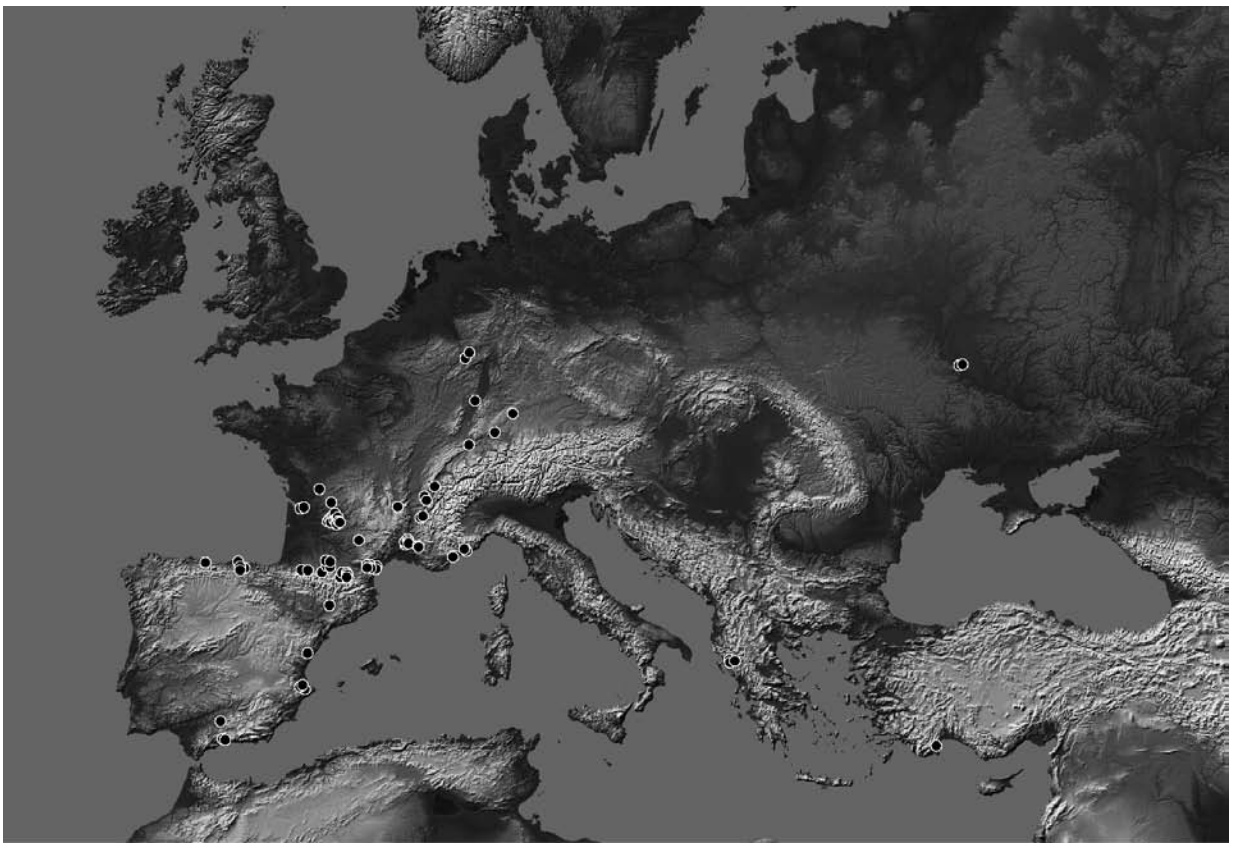

FIG. 10. *Distribution of European Magdalenian sites with marine molluscs of exclusively Mediterranean origin, transformed into pendants.*

they were probably procured through contacts with groups occupying areas further to the south.

There were two main techniques in use to enable these teeth to be suspended: sawing them and perforating them. Most of the reindeer incisors were sawn off at the alveoles. This way of working the teeth is characteristic of the Magdalenian in Europe, from the middle part of the period onwards, and has been found at numerous archaeological sites (Fig. 11), and in the teeth of other animals (bovine incisors, etc.). However, as occurs with the recent shells, sawn teeth have so far only been found at the more western sites within Central Europe. Most of the teeth made into pendants lack decoration, which contrasts with the varied decoration on teeth found at sites in Southwest Europe.

Beads and pendants made out of bone, antler and ivory are less commonly found in deposits. These materials are suitable for engraving naturalistic or schematic figures on their surface, or for sculpting into the shape of animals. Among this type of objects, the most important are *rondelles* made out of bone. This kind of disc with a central perforation is characteristic of middle Magdalenian deposits in the Southwest of Europe, whereas they appear somewhat later (late-final Magdalenian) in Central Europe (Álvarez-Fernández, 2006; Corchón and Rivero, 2008) (Fig. 12).

The most commonly used raw material of mineral origin was jet. This organogenic rock is very common in Magdalenian sites in the rest of Europe. As deposits of jet can be found near many European archaeological sites, this is a local type of raw material. As well as for manufacturing beads, it was used to make small animal statuettes. The discs with central perforation and the "Petersfels type" of feminine figures are only known in regions of Central Europe (Álvarez-Fernández, 2006) (Fig. 13).

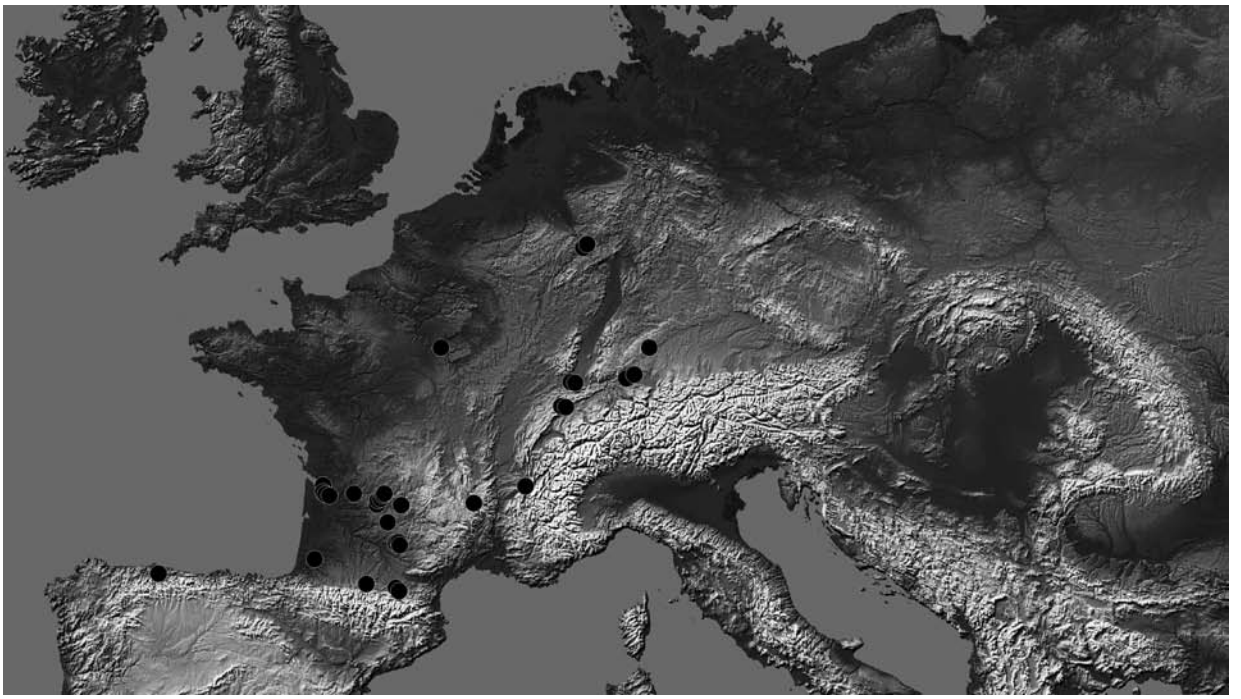

FIG. 11. *Distribution of Magdalenian sites in Europe with reindeer incisors sawn off at the alveoles.*

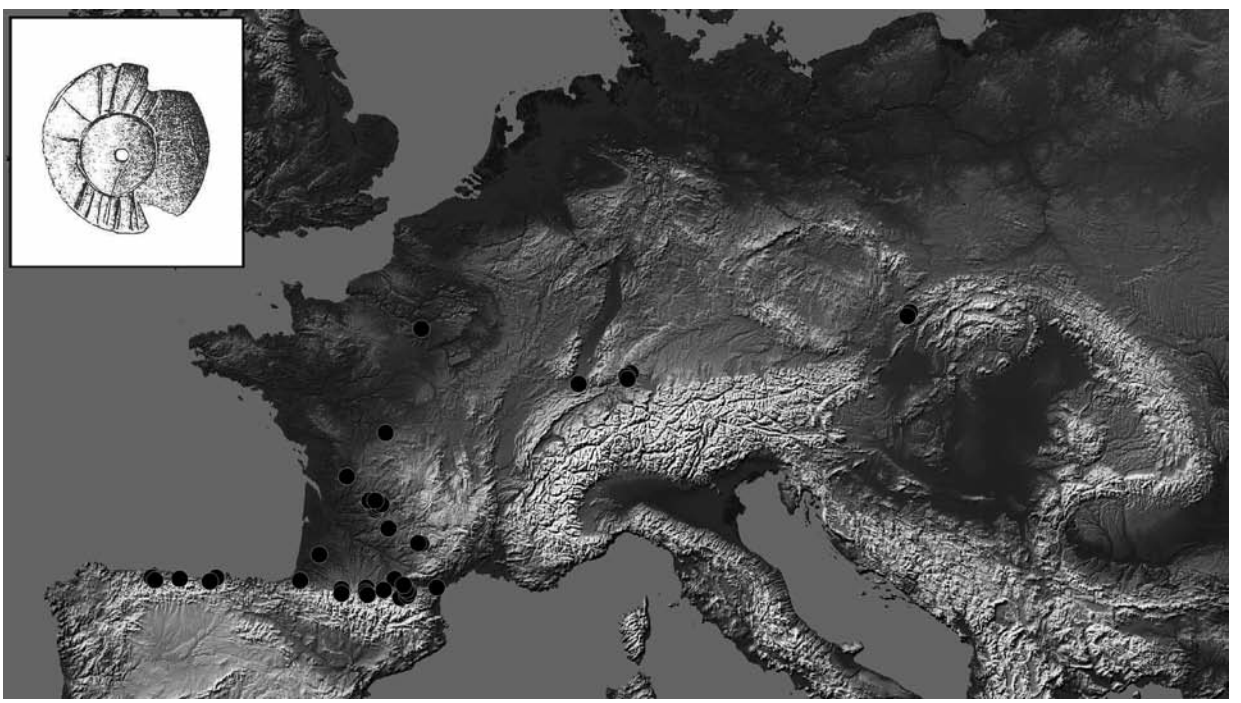

FIG. 12. *Distribution of European Magdalenian sites with* rondelles *made out of bone.*

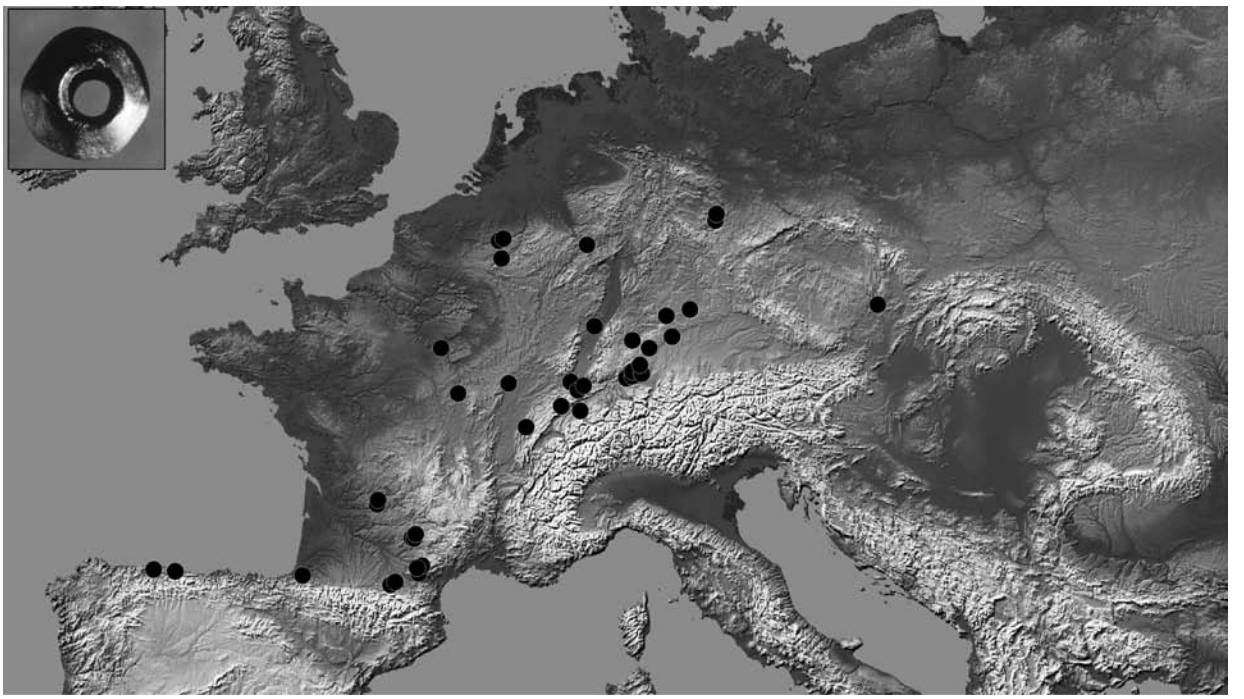

FIG. 13. *Distribution of European Magdalenian sites pendants made out of jet.*

3. Final considerations

Most of the personal ornaments recorded at Magdalenian sites in Central Europe come from its western sector, where the number of known sites is greater than in the rest of the area. From the middle Magdalenian onwards, the presence of pendants in this area precisely is clear evidence of contacts with areas in Southwest Europe, where the marine molluscs of Atlantic or Mediterranean origin were made into beads. The provenance of the other raw materials used to make this objects is almost impossible to establish, but owing to their small size and little weight, they are easy to transport, which makes them ideal artefacts to be exchanged with other regions. This is the case of red deer atrophied canines, found perforated in Magdalenian deposits in Central Europe, where there no remains in the faunal assemblage showing this animal are had been hunted. The presence of artefacts made out of other raw materials could indicate the group manufactured them with locally obtained material (perhaps at times imitating the same forms and decorations as those of their neighbours) or could be a result of exchanges with other groups.

In this way, the study of the Magdalenian personal ornaments found in Europe suggests the existence of a quite complex network of contacts between different groups of hunter-gatherers during this time.

Bibliography

AFFOLTER, J.; CATTIN, M.-I.; LEESCH, D.; MOREL, Ph.; PLUMETTAZ, N.; THEW, N. and WENDLING, G. (1994): "Monruz-Une nouvelle station magdalénienne au bord du lac de Neuchâtel", *Archéologie Suisse*, 17, pp. 94-104.

ALBRECHT, G. (1979): *Magdalénien-Inventare vom Petersfels. Siedlungsarchäologische Ergebnisse der Ausgrabungen 1974-1976*. Verlag Archaeologica Venatoria, Band 6. Tübingen: Institut für Urgeschichte der Universität.

ALBRECHT, A.; BERKE, H.; BURKERT, W.; HAAS-CAMPEN, S. and HAHN-WEISHAUPT, A. (1994): "Die Funde vom Petersfels in der Städtischen Sammlung Engen im Hegau", *Fundberichte aus Baden-Württemberg*, 19 (1), pp. 25-31.

ÁLVAREZ-FERNÁNDEZ, E. (1999): *Arte Mueble Renano: Gönnersdorf y Andernach-Martinsberg-2, Neuwied, Alemania (Estudio de las perlas de madera fósil del*

Terciario y de los objetos de adorno-colgantes sobre dientes de zorro y ciervo). Grado de Salamanca (Tesina). Salamanca: Universidad de Salamanca (Unpublished).

— (2001): "L'axe Rhin-Rhône au Paléolithique supérieur récent: l'exemple des molusques utilisés comme objets de parure", *L'Anthropologie*, 105 (4), pp. 547-564.

— (2006): *Los objetos de adorno-colgantes del Paleolítico superior y del Mesolítico en la Cornisa Cantábrica y en el Valle del Ebro: una visión europea.* Salamanca: Ed. Universidad de Salamanca (Colección Vítor n.º 195).

Baales, M. (2002): *Der spätpaläolithische Fundplatz Kettig. Untersuchungen zur Siedlungsarchäologie der Federmesser-Gruppen am Mittelrhein*. Mit Beiträgen von F. Bittmann, A. Ickinger, H. Kierdorf, J. Krey, D. Mania, A. Pawlik, J. Tinnes. Monographien des Römisch-Germanischen Zentralmuseums, 51. Mainz: Verlag des Römisch-Germanischen Zentralmuseums.

Barge-Mahieu, H.; Bellier, C.; Camps-Fabrer, H.; Cattelain, P.; Mons, L.; Provenzano, N.; Taborin, Y.; Didart, P.; Bott, S. and Choï, S.-Y. (1991): *Objets de Parure. Fiches typologiques de l'industrie osseuse préhistorique. Cahier IV*. Aix-en-Provence: Université de Provence.

Bosinski, G. (1979): *Die Ausgrabungen in Gönnersdorf 1968-1976 und die Siedlungsbefunde der Grabung 1968*. Der Magdalénien-Fundplatz Gönnersdorf, Band 3. Wiesbaden: F. Steiner Verlag.

— (1982): *Die Kunst der Eiszeit in Deutschland und in der Schweiz*. Kataloge Vor- und Frühgeschichte Altertümer, Band 20. Bonn: Rudolf Habelt GMBH.

Bosinski, G.; D'Errico, F. and Schiller, P. (2001): *Die gravierten Frauendarstellungen von Gönnersdorf*. Der Magdalénien-Fundplatz Gönnersdorf, Band 8. Wiesbaden: F. Steiner Verlag.

Bosinski, H. (1981): "Der Schmuck". In Bosinski, G. (Hrsg.): *Gönnersdorf. Eiszeitjäger am Mittelrhein*. Koblenz: Landesmseums Koblenz, pp. 83-89.

Corchón Rodríguez, M. S.; Álvarez-Fernández, E. and Rivero Vilá, O. (2009): "Contactos extracantábricos en el Magdaleniense: nuevos datos de la cueva de Las Caldas". In *I Mesa Redonda sobre Paleolítico Superior Cantábrico: San Román de Candamo* (26-28 abril 2007). Santander: Monografías del IIIPC.

Corchón Rodríguez, M. S. and Rivero Vilá, O. (2008): "Los rodetes del Magdaleniense Medio cántabro-pirenaico: análisis tecnológico y nuevas evidencias de la cueva de Las Caldas (Asturias, España)", *Zephyrus*, LXI (1), pp. 61-84.

Dewez, M. (1987): *Le Paléolithique supérieur récent dans les Grottes de Belgique*. Louvain-la-Neuve: Publications d'Histoire de l'Art et d'Archéologie de l'Université Catholique de Louvain, LVII.

Eickhoff-Cziesla, S. (1992): *Wohnplatzstrukturen-Strukturierung eines Wohnplatzes. Zur Besiedlungsgeschichte des Magdalénien-Fundplatzes Andernach*. Doktorarbeit. Köln: Universität zu Köln (Unpublished).

Eriksen, B. V. (1991): *Change and Continuity in a Prehistoric Hunter-Gatherer Society: a study of cultural adaptation in late glacial-early postglacial southwestern Germany*. Archaeologica Venatoria, 12. Tübingen: Institut für Urgeschichte der Universität Tübingen.

Féblot-Augustins, J. (1997): *La circulation des matières premières au Paléolithique: Synthèse des données. Perspectives comportementales*. Liége: ERAUL, 75 (2 vols.).

Floss, H. (1994): *Rohmaterialversorgung im Paläolithikum des Mittelrheingebietes*. Römisch-germanisches Zentralmuseum. Forschungsinstitut für Vor- und Frühgeschichte, Monographien Band 21. Bonn: Dr. R. Habelt GMBH.

Hahn-Weishaupt, A. (1994): "Der Schmuck vom Petersfels". In Albrecht, A.; Berke, H.; Burkert, W.; Haas-Campen, S. and Hahn-Weishaupt, A.: "Die Funde vom Petersfels in der Städtischen Sammlung Engen im Hegau", *Fundberichte aus Baden-Württemberg*, 19 (1), pp. 25-31.

Heierli, J. (1907): *Das Kesslerloch bei Thaingen*. Neue Denkschriften der Schweizerischen Naturforschenden Gesellschaft, 43. Basel, Genève & Lyon: Kommissions-Verlag von Georg & Co.

Heizmann, E. P. J. (1992): *Das Tertiär in Südwestdeutschland*. Stuttgart: Stuttgarter Beiträge zur Naturkunde, Serie C, 33.

Hladilová, Š. (1999): "Miocenní Fosilie z Magdalénienských lokatit v Horavském Krasu", *Acta Musei Moraviae*, LXXXIV (1-2), pp. 117-132.

Höck, Chr. (1993): "Die Frauenstatuetten des Magdalénien von Gönnersdorf und Andernach", *Jahrbuch des Römisch-Germanischen Zentralmuseums Mainz*, 40 (1), pp. 253-316.

— (2000): *Das Magdalénien der Kniegrotte. Ein Höhlenfundplatz bei Döbritz, Saale-Orla-Kreis*. Weimarer Monographien zur Ur- und Frühgeschichte, Band 35. Thüringisches Landesamt für Archäologische Denkmalpflege. Stuttgart: K. Theiss Verlag.

Housley, R. A. (1998): "The return of the natives: AMS radiocarbon dating of Magdalenian artefacts and the recolonisation of northern Europe after the last Ice Age". In Bayley, J. (ed.): *Science in Archaeology, an agenda for the future*. London: English Heritage, pp. 9-20.

Kozłowski, St. K.; Sachse-Kozłowska, E.; Marshack, A.; Madeyska, T.; Kierdorf, H.; Lasota-Moskalewska, A.; Jakubowski, G.; Winiarska-Kabacińska, M.; Kapica, Z. and Wierciński, A. (1993): "Maszycka Cave, a Magdalenian Site in Southern

Poland", *Jahrbuch des Römisch-Germanischen Zentralmuseums Mainz*, 40 (1), pp. 115-252.

KRAUS, A. (2001): *Die Magdalénienfunde des Hohlenstein bei Ederheim (Nördlinger Ries)*. Magisterarbeit. Köln: Universität Köln (Unpublished).

LAZAR, E. (1974): "Bestimmung der Fossilien Mollusken". In FEUSTEL, F.: *Die Kniegrotte. Eine Magdalénien-Station in Türingen*. V[e] Veröffentlichungen des Museums Ur- und Frühgeschichte Thüringens, Band 5. Weimer: H. Böhlaus Nachfolger, 96 pp.

MANIA, D. (1999): *Nebra- eine jungpaläolithische Freilandstation im Saale-Unstrut-Gebiet*. Halle (Saale): Veröffentlichungen des Landesamtes für Archäologie Sachsen-Anhalt-Landes Museum für Vorgeschichte, Band 54.

NÜESCH, J. (1902): *Das Schweizersbild, eine Niederlassung aus paläolitischer und neolithischer Zeit*. Zürich: Zweite, verbesserte und vermehrte Auflage.

POPLIN, F. (1983a): "Die bearbeiteten Zähne vom Rentier und anderen Tieren vom Petersfels". In ALBRECHT, G.; BERKE, H. and POPLIN, F. (Hrsgs.): *Naturwissenschaftlische Untersuchungen an Magdalénien-Inventaren vom Petersfels, Grabungen 1974-1976*. Verlag Archaologica Venatoria, Band 8. Tübingen: Institut für Urgeschichte der Universität Tübingen, pp. 133-153.

— (1983b): "Incisives de renne sciées du Magdalénien d'Europe Occidentale". In POPLIN, F. (ed.): *La faune et l'Homme Préhistoriques*. Dix études en hommage à Jean Bouchud reunies par François Poplin. Paris: Memoires de la Societé Préhistorique Française, 16, pp. 55-67.

RÄHLE, W. (1983): "Schmuck aus Mollusquenschalen von der Magdalénien-Station Petersfels bei Eingen (Hegau)". In ALBRECHT, G.; BERKE, H. and POPLIN, F. (Hrsgs.): *Naturwissenschaftlische Untersuchungen an Magdalénien-Inventaren vom Petersfels, Grabungen 1974-1976*. Verlag Archaologica Venatoria, Band 8. Tübingen: Institut für Urgeschichte der Universität Tübingen, pp. 154-160.

— (1987): "Schmuck aus Molluskenschallen von dem Abri Felsställe bei Mühlen, Stadt Ehingen, Alb-Donau-Kreis". In KIND, C. J. (ed.): *Das Felsställe. Eine jungpaläolithisch-frümesolithische Abri-Station bei Ehingen-Mühlen, Alb-Donau-Kreis. Die Grabungen 1975-1980*. Forschungen und Berichte zur Vor- und Frühgeschichte in Baden-Württemberg, 23. Stuttgart: K. Rheiss Verlag, pp. 383-385.

SEDLMEIER, J. (1982): *Die Hollenberg-Höhle 3, ein Magdalénien-Fundstelle bei Arlesheim, Kanton Basel-Landschaft*. Basler Beiträge zur Ur- und Frühgeschichte, Band 8. Derendigen: Habegger Verlag Derendigen-Solothurn.

STREET, M. (1993): *Analysis of Late Palaeolithic and Mesolithic faunal assemblages in the northern Rhineland (Germany)*. Doctoral Thesis. Birmingham: University of Birmingham (Unpublished).

TABORIN, Y. (1990): "Le décor des objets de parure". In CLOTTES, J. (dir.): *L'Art des Objets au Paléolithique. Tome 2: Les voies de la recherche*. Colloque international Foix-Le Mas d'Azil (16-21 nov. 1987). Actes des colloques de la Direction du Patrimoine. Paris: Ministère de la Culture, de la Comunication, des Grands Travaux et du Bicentenaire, pp. 19-37.

— (1993): *La parure en coquillage au Paléolithique*. XXIX Supplément *"Gallia Préhistoire"*. Paris: CNRS.

— (2004): *Langage sans parole. La parure aux temps préhistoriques*. Paris: Éd. La Maison des Roches.

TERBERGER, T. (1997): *Die Siedlungsbefunde des Magdalénien-Fundplatzes Gönnersdorf. Konzentrationen III und IV.* Der Magdalénien -Fundplatz Gönnersdorf, 6. Stuttgart: F. Steiner Verlag.

— (1998): "Siedlungsspuren zwischen 20.000 und 16.000 am Mittelrhein? Vorbericht zu den Ausgrabungen an der jungpaläolitischen Freilandstation Wiesbaden-Igstadt, Hessen", *Germania*, 78 (2), pp. 403-437.

WELTER, C. (2001-2002): *Essai de paléoécomomie des sites du Paléolithique supérieur récent. Relation entre la Belgique et les pays voisins*. Bruxelles: Université Libre de Bruxelles. Faculté de Philosophie et Lettres. Mémoire présenté en vue de l'obtention du titre de licencié en section Histoire de l'Art et Archéologie, specialisation Pré- et Protohistoire (Unpublished).

WENINGER, B.; JÖRIS, O. and DANZEGLOCKE, U. (2007): *CalPal-University of Cologne Radiocarbon Calibration Program Package*. CalPal2007_HULU. Köln: Institut der Ur- und Frühgeschichte, Universität zu Köln (http://www.calpal.de).

