Terra Amata
Nice, Alpes-Maritimes, France

Tome IV

Les industries acheuléennes

Sous la direction de Henry de LUMLEY

avec la collaboration de

Dominique Cauche, Khalid El Guennouni, Alain Fournier, Sophie Grégoire,
Bertrand Lecervoisier, Olivier Notter, Guy Pollet, Thierry Roger,
Elena Rossoni-Notter, Bertrand Roussel, Cyril Viallet

et le concours de

Christiane Derouillat, Élisabeth Fauquembergue, Emmanuelle Fernandez, Cédric Fontaneil,
Charlotte Frégier, Noël Garrigue, Rodolphe Guilard, Bernard Magnaldi et Henri Puech †

TERRA AMATA

Nice, Alpes-Maritimes, France

Tome IV – Fascicule 1

Les industries acheuléennes

CNRS ÉDITIONS

15, rue Malebranche – 75005 Paris

Direction régionale
des affaires culturelles
Provence-Alpes-Côte d'Azur

Ministère de l'éducation nationale,
de l'enseignement supérieur
et de la recherche

Conseil Général
des Alpes-Maritimes

Ville de Nice

Institut
de Paléontologie Humaine

Fondation Albert Ier
Prince de Monaco

Laboratoire départemental
de Préhistoire du Lazaret

Musée de Paléontologie Humaine
de Terra Amata

Centre Européen
de Recherches Préhistoriques
de Tautavel

Université de Périgord
via DomitiaUD

Département
des Sciences Préhistoriques
du Muséum National
d'Histoire Naturelle

Appendice XII

THE ACHEULEAN IN CENTRAL EUROPE: DID IT EXIST OR NOT? L'ACHEULÉEN EN EUROPE CENTRALE: EXISTAIT-IL OU NON?

par
Jürgen RICHTER*

Les grands sites du Paleolithique Ancien en Europe centrale ont presque exclusivement délivré des industries à éclats avec, par exemple, les restes d'*Homo heidelbergensis* a Bilzingsleben et les lances en bois a Schöningen. En revanche, au Paléolithique moyen ancien, on observe des bifaces dans les industries du "Jungacheuléen" (Acheuléen supérieur d'Europe centrale; Markkleeberg – Saalien ancien). Dans le Micoquien/MMO d'Europe centrale ou le "Keilmessergruppen" (Paléolithique moyen tardif; Bockstein, Sesselfelsgrotte, Buhlen - Weichselien moyen), on observe essentiellement des pièces foliacées, les vrais bifaces sont exceptionnels. Néanmoins, les découvertes de bifaces en Europe centrale restent tres rares. Le plus souvent, ils sont retrouvés hors contexte stratigraphique et isolés. Certaines de ces pièces, par analogie, peuvent être attribuées au Paléolithique moyen, d'autres, plus rares, évoquent des pièces bifaciales d'Europe de l'ouest de l'Acheuléen moyen.

The "Movius line" describes one of the first cultural frontiers in the history of mankind, dividing the Old World into two hemispheres: On the one hand Africa together with Southern and Western Europe, the Near East and India and on the other hand Northern Eurasia and Eastern Asia, on the one hand handaxe-and-cleaver-industries and on the other pebble-tool-and-flake-industries. A possible map of all Lower Palaeolithic sites in Eurasia (from 1,800,000 years old Dmanisi to the 300,000 years old Bilzingsleben site) would indeed support the existence of such a frontier, stretching from the Himalaya region in the East to the River Rhine in the West, handaxes only occuring south and west of the Movius frontier line. Although fascinating in its simplicity, the Movius model raises more questions than answers if tested on a regional scale. On this scale, the Central European evidence is ambiguous.

Early and Middle Acheulean handaxes seem to be absent from Western Central Europe. According to the German nomenclature, only Early and Middle Acheulean are considered belonging to the Lower Palaeolithic, Late Acheulean (Acheuléen supérieur, Jungacheuléen), however, is considered to belong to the early Middle Palaeolithic, because standardized flake production methods, such as the Levallois method, accompany and even dominate such assemblages. The Central European Micoquian (Keilmessergruppen/KMG, Mousterian of Micoquian Option/MMO) predominantly displays asymmetric bifacial tools, sometimes backed (Keilmesser, French: Pradniks), rather than handaxes, which occur in small numbers only. The Central European Micoquian occurs in OIS 4/3, at the very end of the Middle Palaeolithic. Consequently, only the Early and Middle Acheulean concern the Central European Lower Palaeolithic.

"Chronologically, nearly all the handaxes, as far as they are typologically identifiable, belong to a late stage of development, thus being predominantly Late Acheulean and Micoquian, and also belonging partly to the 'Moustérien de tradition acheuléenne'. This was difficult to recognise when dealing with isolated finds." (Schwabedissen 1970, 79)

This statement can still claim some validity, although the state of research concerning the German Lower Palaeolithic has essentially been improved since. Whereas Lower Palaeolithic archaeological sites were practically non-existent at that time, several important, well-dated sites have been discovered since and have been systematically excavated (fig. 87). But still, most of the Central European handaxes were usually found isolated, without archaeological context. If Central European handaxes were found in archaeological contexts, they mostly turned out to belong to Middle Palaeolithic industries, such as Jungacheuléen at Markkleeberg (OIS 8 or OIS 6) and "Central European Micoquian" (MMO) at Salzgitter-Lebenstedt (OIS 4/3), all of them containing, along with the bifacially worked tools, unifacial toolkits subject to the Mousterian principles of tool production.

Generally, Central Europe was certainly not among the earliest areas in Europe to be settled by humans (fig. 88).

* Professeur Docteur. Jürgen Richter – Institut für Ur- und Frühgeschichte – Universität zu Köln – 50923 Köln – Allemagne – E-mail: al002@uni-koeln.de

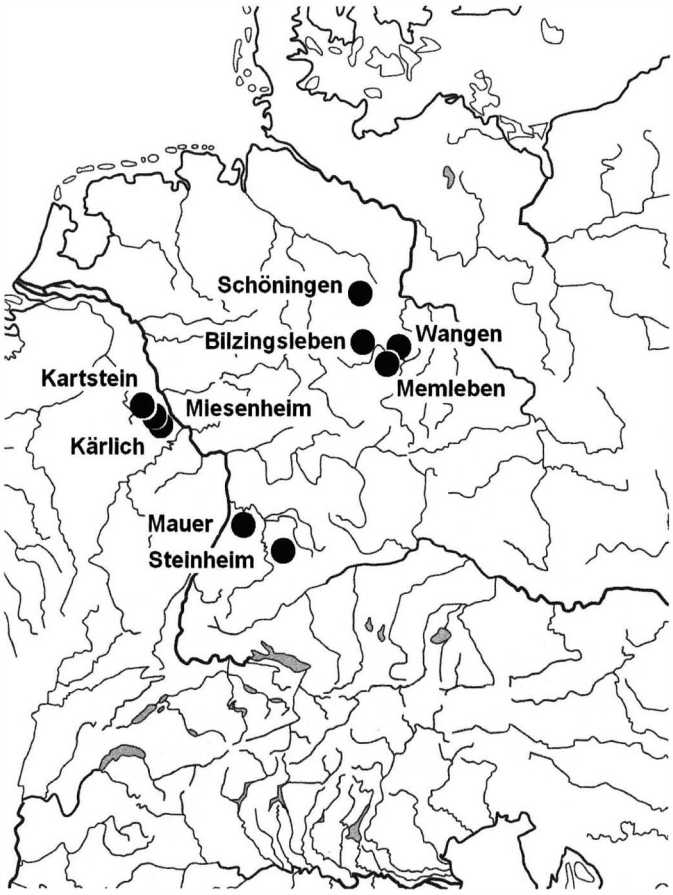


Figure 87: *Map of Lower Palaeolithic sites in Germany.*

Except the Mauer mandibula, Miesenheim and Kärlich, there is no secure proof for human presence earlier than OIS 10/9, i.e. 350,000 B.P. The important sites of Bilzingsleben and several sites at Schöningen all centre at around OIS 9 or 300,000 B.P.

Because the Western European Early Palaeolithic Acheulean came to an end shortly after 300,000, only a small time window was theoretically left for a possible Acheulean culture in Central Europe. The same time window coincided with the final stage of the cold period before the Holsteinian and the warm period of the Holsteinian Interglacial itself (and possibly the Reinsdorf Interglacial). Important sites from this time window (Schöningen, Bilzingsleben) were alternatively integrated into the Acheulean cultural complex (Laurat 2003), based on several bifacially retouched artefacts, or to the "Lower Palaeolithic Microlithic Complex" (Burdukiewicz 2003), thus contrasting the contemporaneous Western European handaxe cultures.

No evidence for human presence prior to 600,000

It has been stated that, north of the Alps, early Palaeolithic sites are missing from geological contexts with reverse magnetisation. This means that all Central European sites are later than the Matuyama-Brunhes palaeomagnetic transition at around 780.000 BP. which defines the Early to Middle Pleistocene boundary (fig. 88).

Within the Middle Pleistocene, the evolution of rodents has set another important chronological mark. Between 600,000 and 500,000 B.P. the species Mimomys savini underwent a gradual change of the dentation system which led to the emergence of the rootless Arvicola terrestris species. This evolutionary transition, known as the "Mäuseuhr", allows for chronological correlations of many important Palaeolithic sites and has led to the "short chronology" discussion since the 1990ies, initiated by Th. Van Kolfschoten and W. Roebroeks (Roebroeks 2001). In Central Europe, not a single undisputable Palaeolithic site connected with Mimomys savini occurrences has come to our knowledge so far. This means that Central Europe lacks any human settlement prior to 600,000.

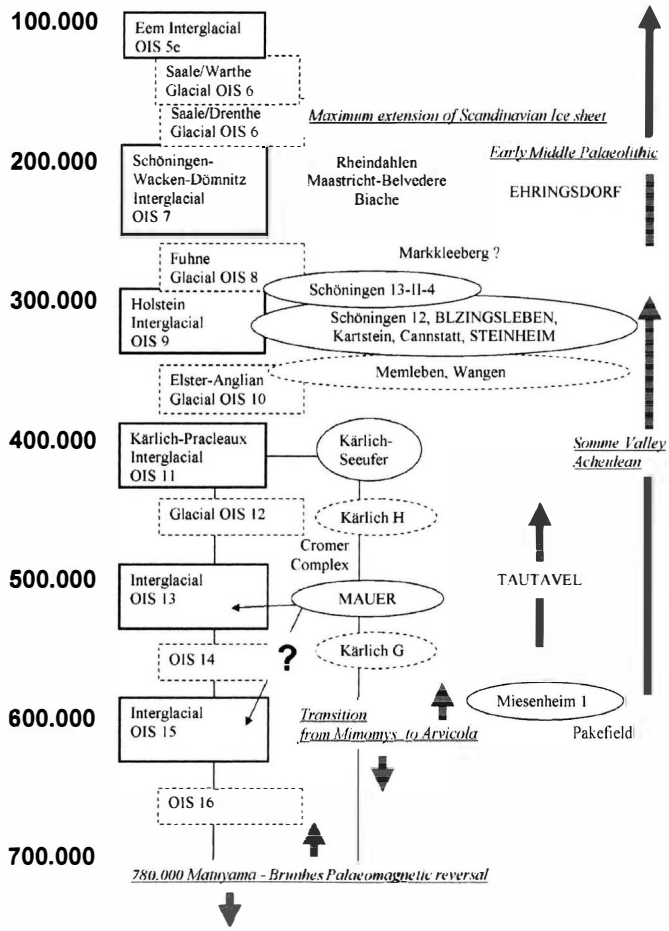


Figure 88: *Revised chronology of the Lower Palaeolithic in Germany. – items framed in broken lines: Glacials/glacial sites; in capitals: Hominid sites; in italics: important chronological markers.*

The important stratigraphic sequence of Kärlich (Middle Rhine) displays both the principal chronological markers mentioned above (Vollbrecht 1997, 34): The Matuyama-Brunhes palaeomagnetic boundary was discovered in stratum Kärlich Bb. Mimomys savini occurs in strata Kärlich C, Kärlich E and Kärlich F. Arvicola terrestris cantiana occurs in stratum Kärlich G (OIS 14), associated with some of the earliest stone artefacts ever found in Central Europe.

This state of research (no pre-600,000 sites; recent overview: Baales 2006; see also Baales *et al.* 2000) has often been questioned and several authors have tried to fill the Early Pleistocene and lower Middle Pleistocene gap. Over the years, a growing number of sites was claimed to be pre-600,000 (Fiedler, ed. 1997), but not a single case delivered reliable proof.

One prominent example of this group is the Dorn-Dürkheim 3 site (Fiedler & Franzen 2002) which dates from around 800,000 (Mimomys savini fauna and reverse magnetisation). Three lithics (Polyedric core, side-scraper, chip; fig. 89 - A) from sands redeposited at a former lakeside are claimed to be artefacts but remain questionable.

Rare traces of the earliest Human occupation in Central Europe (MIS 15-MIS 11)

In Central Europe, north of the high-mountain areas of the Alps and the Pyrenees, the hominid find from the lower sand of the Mauer pit near Heidelberg indicates the earliest presence of man and thus the onset of human presence in Central Europe. Based on the faunal assemblage from the embedding fluvial sands, the Mauer mandibula dates either to OIS 15 or to OIS 13 and should be between 700,000 and 500,000 years old. Mauer is the eponymous site of the "Mauerer Waldzeit" Interglacial. Because Arvicola occurs among the rodent remains, an earlier age than OIS 15 can be excluded for Mauer.

Lithic finds from Mauer, occasionally attributed to the Homo erectus mandibula, are of debatable nature. The artificial origin of most of the lithics seems to be questionable. Published pieces, mostly chunks, not flakes, show damages at all edges instead of retouched working edges, and the vast majority of finds is without stratigraphic context (fig. 89 - B).

In the Middle Rhine region (overview: Bosinski & Richter 2007) there is one site of approximately the same age: Miesenhein I. The Miesenheim I site northwest of Coblence (Turner 2000) delivered a number of 1,600 faunal ramains of interglacial nature (f.e. Rhino, Pig, Horse, Red Deer, Elk), along with some simple flakes, cores and chunks. Rodent remains include Arvicola as an important chronological indicator. As the find horizon underlies glacial sediments followed by an interglacial volcanic eruption dated to 464,000 ± 4,000, the approximate date must be one glacial/interglacial cycle earlier, at around 600,000, during OIS 15. The small artefacts, made of local tertiary quartzite and quartz, display irregular, somewhat accidental shapes, two of them burnt and thus attesting an early use of fire (fig. 89 - C). The huge accumulation of bones has been regarded as a product of both human and natural agents (Turner 2000).

The Layer G site of the Kärlich clay mine delivered 14 artefacts (among them three cores, five flakes, one cleaver, two borers, one scraper and one chopper; Vollbrecht 1997, pl. 22-25) and is only slightly younger than Miesenheim I. The finds come from Loess sediments underlying the Kärlich H geological sequence. Kärlich H includes a lower Tephra layer (KAE-DT 1) and an upper Tephra layer (KAE-DT 2), both dated by 49Ar/39Ar to probably around 450,000 BP (OIS 12). This means that Kärlich layer G should be one climatic cycle older than Kärlich H and must thus be

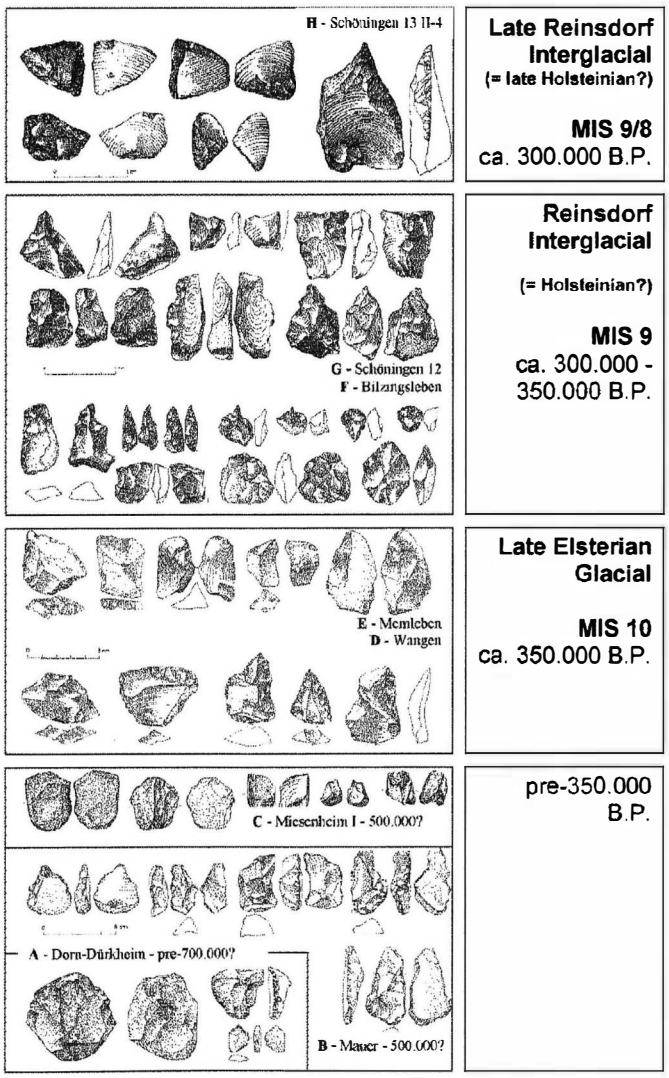


Figure 89: *Some examples of Lower Palaeolithic pseudo-artefacts or uncertain artefacts (A, B and partially C?) and attested artefacts (D-H) in Germany (compiled after Fiedler 1997, ed., 29, 31, 32; Mania 1997, 145, 146, 147, 153, 154; von Berg in Fiedler 1997, ed. 243; Thieme 2007).*

dated to OIS 14 or at around 550,000 years B.P. OIS 14 is a moderate-cool climatic stage following the Interglacial of Miesenheim I.

The Layer H site of Kärlich (probably from the lower part of layer H) delivered 128 artefacts, some of them produced by bipolar flaking. According to radiometric data from embedded tephra layers, the Layer H Loess can be dated to OIS 12, thus attesting for the first time that humans were present in Central Europe under harsh climatic conditions and in a cold steppe environment. A tusk of a steppe elephant was also found along with the artefacts.

The most important Kärlich site, "Kärlich Seeufer", an interglacial lakeside locale, delivered 146 artefacts (among them two untypical handaxes, see fig. 91 - A) and abundant faunal remains, Elephas antiquus playing an important role (see Gaudzinski 1996 and Bosinski, this volume). Human occupation occurred shortly after the deposition of the "Kärlicher Brockentuff" (covering the Kärlich H horizon), an up to 6 m thick tephra layer produced by a volcanic eruption in the middle of the OIS 11 Interglacial (Kärlich-Rhume-Bilshausen-Pracleaux Interglacial). Along with the published undoubted artefacts, the lithic finds comprise an uncertain ratio of pieces modified by volcanic activity (geofacts or "tephrofacts"; see Gaudzinski 1996, 44).

Concerning the earlier phase of the Lower Paleolithic (before 350,000 B.P.), these are the only hints at the presence of early man in Central Europe. Other sites sometimes mentioned and claimed artefacts of that age, turned out to be pseudo-artefacts or remained unclear in respect of their artificial origin. Few dozens of artefacts from Miesenheim I, Kärlich G, and Kärlich H, mostly flakes, do not allow for any technological or typological classification, neither in favour of a possible Acheulean nor against it. Only the handaxes, although quite untypical, from Kärlich-Seeufer might indicate relations towards western European Acheulean occurences, during OIS 11. Moreover, the geographic position of the Kärlich quarry site west of the Rhine River Valley lies at the eastern periphery of a possible Acheulean cultural area, seen from a Western European perspective.

Recent Problems concerning the late Middle Pleistocene Chronology

Contrasting the poor early Lower Palaeolithic evidence, Central European late Lower Paleolithic sites occur to be very rich in artefacts and faunal remains. Such sites are scattered across Central Germany, Bilzingsleben and Schöningen being the most important flagship sites. Wangen, Memleben, Wallendorf, Rudko, Trzebrenica and Wroclaw belong to the same temporal-spatial group of sites (Moncel 2010).

Two chronological problems are connected with this group of sites: Firstly, the Holsteinian Interglacial has turned out to be considerably younger than previously supposed, and secondly a new warm phase, the Reinsdorf Interglacial, has been established within the same chronological zone (table 87).

All sites of this group were previously dated to the Holsteinan and to OIS 11 and shortly before and after that interglacial, because OIS 11 was formerly supposed to be the equivalent to the palaeobotanical Holstein stratigraphic unit. Recent re-evaluation, however, of the stratigraphic evidence at the Holsteinian palaeobotanical type site (Geyh & Müller 2005) yielded a long series of OIS 9 numerical data (table 86) and has since implied the hypothesis of a later and shorter chronology of the Central German late Lower Palaeolithic group of sites. Although these new data for the Holstein-Landos-Hoxne-Mazovia Interglacial (OIS 9) will be used as a preliminary guideline in this paper, it must be stated that the chronological debate is still to be continued. The ongoing excavations at the Schöningen lignite quarry will probably contribute to, if not solve, the question of either an OIS 11 or an OIS 9 age of the Bilzingsleben/Schöningen archaeological group of sites.

	Pollen Analytical Zones	Sediment	230Th/U-Dates, average
Late Holstein	Pollen Analytical Zones MM XIII to MM XIV	Fen peat	327^{+130}_{-37} N = 7
Middle Holstein	No Pollen; Transgression of the Holsteinian Sea	Clay silt sand	
	Pollen Analytical Zone MM VI	Fen peat	312 ± 3 N = 7
Early Holstein	Pollen Analytical Zones MM II to MM V	Gyttja	
Elster Late Glacial	Pollen Analytical Zone MM I	Gyttja	

Tableau 86: *Pollen Analytical Zones*

As an additional problem to be solved, the Bilzingsleben and Schöningen sites have recently been attributed to the newly defined Reinsdorf Interglacial (table 87) which has been regarded as being younger than the Holsteinian (now OIS 9) and older than the Schöningen-Dömnitz-Wacken-Interglacial (OIS 7). The problem occurs that there is no space left for an additional interglacial (Reinsdorf) at this stage of the global climatic (deep sea) record. Two solutions have been discussed for this problem:

1. Based on the similarity among both palynological sequences, Th. Litt has recently argued for both Holstein and Reinsdorf belonging to one and the same warm period (now OIS 9, around 300,000 B.P.), the latter being an equivalent to the late stage of the former (Litt *et al.* 2007).

2. If Reinsdorf is different from and younger than Holstein (OIS 9), it might belong to the OIS 7 interglacial complex

Warthe / Vergletscherung / Drenthe	C IV
Hiatus	
Elm C	C III
Büddenstedt II	
Elm B	
Büddenstedt I	
Elm A	
Schöningen Interglazial	
Hiatus	
Reinsdorf - Stadial C	Level 5
Reinsdorf - Interstadial B	Level 4
Reinsdorf - Stadial B	
Reinsdorf - Interstadial A	Level 3
Reinsdorf - Stadial A	C II Level 2
Reinsdorf - Interglazial	Level 1
Hiatus	
Stadial SU A	C I
Interstadial SU A	
Buschhaus B	
Missaue I	
Missaue II	
Buschhaus A	
Holstein Interglazial	
Hiatus	
Esbeck	
Offleben II	
Hiatus	
Offleben I	
Vergletscherung	

Tableau 87: *Palaeobotanic record of Schöningen. Old chronological hypothesis: Cycles CI-VI represent interglacial units, here arranged as a proposed sequence, all separated by possible chronological gaps (after Urban in Thieme 2007).*

which is threefold, as indicated by the deep sea cores. In this case, it should be dated to the first part of the OIS 7 interglacial complex, and the "Schöningen-Wacken" interglacial should be a later stage of the OIS 7 complex. This version was recently advocated by S.Soriano (Soriano 2000).

The attested similarity of parts of the Holsteinian and Reinsdorfian vegetational history supports the first solution for the time being. Some years ago, another chronology was proposed which assumes Schöningen 13-II-4 (the spear horizon) to be contemporaneous with OIS 9, based on the assumption that the Holstein and Pracleaux interglacials are the same and should belong to OIS 11 (Jöris & Baales 2003). Because Holstein is now dated to OIS 9 this argument must now be rejected, although the result is very close to the first solution presented by Th.Litt.

Large assemblages and the earliest attested campsites (MIS 10/9)

The archaeological record is poor if the length of the time span after MIS 11 and before MIS 9 is considered. The only secure traces of human presence in Western Central Europe come from Central Germany. At Memleben and Wangen flakes and retouched tools were found in a geological context immediately preceding the Holsteinian Interglacial. If the Holsteinian must now be dated to OIS 9, the Memleben and Wangen finds belong to OIS 10. The sites are connected with Unstrut and Saale river gravel beds attributed to the Late Elsterian Glacial (Eissmann 1994, 83). D. Mania does not exclude the possibility that these finds belong to the preceding Interglacial (Mania 1997, 111) which would now coincide with OS 11. Wangen delivered about 50 and Memleben 104 artefacts, including flakes, cores and simple tools. These artefacts have usually been classified as "Clactonian" (Schäfer 1993, 69-70). Some of them show well-organized striking plattforms, such as dièdre (fig. 89 - D) and facetted (fig. 89 - E).

At Bilzingsleben (valley of the Wipper, a tributary to the Saale River) several decades of continuous excavation produced more than 100,000 stone artefacts along with skeletal remains of Homo erectus and abundant remains of an interglacial antiquus fauna (now OIS 9). The finds come from travertine sands at the shore of a small fossile lake, later covered by lacustrine limestone and sealed by travertine.

The lithic industry is characterized by its microlithic dimensions, by standardized tool forms (scrapers, borers etc.) and by a standardized flake production on centripetal and unidirectional cores. Recently, Th.Laurat compiled a whole series of small, bifacially worked artefacts from Bilzingsleben (Laurat 2003). The existence of bifacial tools led him to the conclusion that Bilzingsleben should be concidered a Middle Acheulean inventory, rich in unifacial tools on functional reasons. Future technological analysis must test this hypothesis. At the present state of research it is not clear whether the artefacts mentioned

are real products of a faconnage concept of production (as it should be if it is Acheulean) or if they came into existence by reduction processes on unifacial tools.

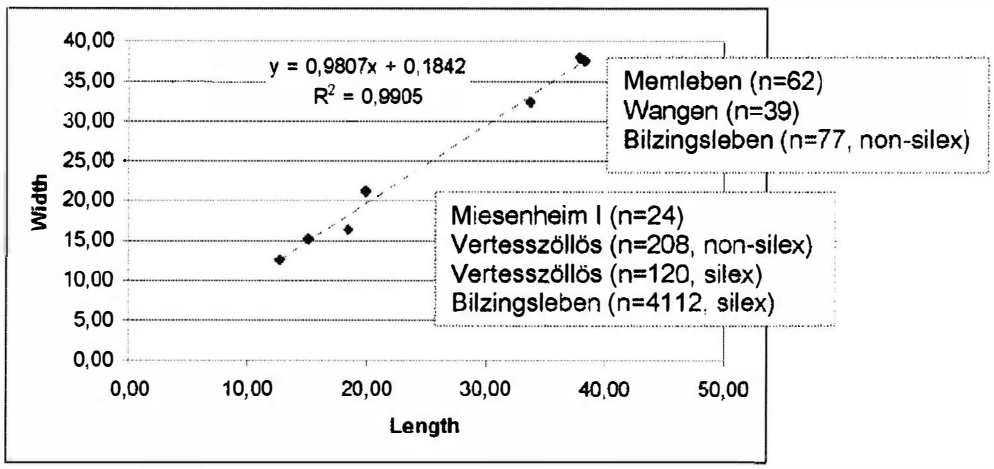
The microlithic sizes of the Bilzingsleben artefacts depend strongly on the silex raw material involved (Schäfer 1993, 69), which was only available in small volumes and had to be acquired from some distance. The raw material sources were on the neighbouring plateau, where the Elsterian glaciers and melting waters had transported and deposited sediments containing silex of northern European origin. Attribute analysis of the flake dimensions produces two distinct groups, if silex and non-silex artefacts of Bilzingsleben are analysed separately, as done by D. Schäfer (fig. 90). The Bilzingsleben non-silex group has larger dimensions and resembles the Memleben and Wangen samples. The Bilzingsleben silex group has small dimensions, very close to Verteszöllös and Miesenheim I, where all raw material volumes were extremely small. Small nodules provoke shorter operatory chains with only few flakes produced from one core. This may cause difficulties in the identification of standardized flake production concepts, which could be realized only on few larger nodules. Thus, it may well be possible that the producers of the Bilzingsleben flakes mastered flake production better and disposed over much better skills than expected by present researchers.

Bilzingsleben and Verteszöllos play a central role with a model recently put forward by J.M. Burdukiewicz in his recent monograph about the Lower Palaeolithic "microlithic techno-complex", comprising also Schöningen, Rusko, Wroclaw, Trzebenica and the (although questionable) Mauer lithics (Burdukiewicz 2003). In this model, the use of microliths as inserts of composite tools is seen as a common feature of the Central European Lower Palaeolithic and as the principal reason for microlithisation. Future microwear analysis could help to tackle this problem by the particular observation of possible hafting traces.

At the lignite mine of Schöningen, near Helmstedt (Behre 2012), a horizontal sequence of 6 sedimentation stages (Schöningen cycles I to VI) has been found (see table 87), all younger than the underlying Elsterian glacial sediments. Cycles I to III underlie the glacial sediments of the Saalian Glacial (Drenthe phase). This provides us with reliable geostratigraphic dating for Schöningen Cycles I, II and III, all between the Elsterian (now OIS 10) and Saale/Drenthe (OIS 6) Glacials. Cycles I, II, III comprise interglacial limnic sediments and peat units with extraordinary preservation of organic material.

Currently, cycle I is attributed to the Holstein Interglacial (if correct, now OIS 9), including the archaeological site Schöningen 13 I which yielded an elephant tusk (along with bovid, horse and deer bones) and silex flakes, more than 100 of which were burnt. A small number of retouched pieces display notches and denticulated edges (Thieme 2007, 212-216).

Cycle II, attributed to the newly defined "Reinsdorf" Interglacial (now understood as equal to the second half of the Holsteinian ; Litt *et al.* 2007), comprises three important assemblages from two distinct sites : Two archaeological find horizons of the Schöningen 12 site, Schöningen 12, layer 1 and Schöningen 12 layer 2 come from the climatic optimum of the "Reinsdorf" (i.e. Holsteinian) Interglacial and the upper archaeological horizon of the Schöningen 13 site, Schöningen 13 II-4 comes from the late, cooler stage of the same interglacial complex or the beginning of the following glacial stage.



data from D.Schäfer 1993, table 11.

Figure 90 : *Mean dimensions of Lower Palaeolithic flakes. The Bilzingsleben sample shows smaller dimension for silex items and larger dimensions for non-silex items, thus clearly contradicting any interpretation of the Bilzingsleben assemblage as "microlithic" by cultural choice. Dimensional classes obviously mirror the availability of raw material in sufficient volumes (data from Schäfer 1993).*

Layer 1, the lower horizon of the Schöningen 12 sequence (Thieme 2007, 192-201), delivered stone artefacts, including notched pieces and points which fit well to the Bilzingsleben assemblage. Recently, D. Mania attributed the Bilzingsleben II stratigraphic complex (including the principal find horizon of Bilzingsleben) to the climatic optimum of the "Reinsdorf" (i.e. Holsteinian) Interglacial, thus arguing for contemporaneity of Bilzingsleben and Schöningen 12. The stone artefacts (fig. 89 - G, except first piece in upper row) from Schöningen 12, layer 1, however, seem to be somewhat larger than the microlithic pieces from Bilzingsleben (fig. 89 - F), thus underlining the special nature of the raw material available near Bilzingleben only of lower quality. Faunal remains at Schöningen 12 reflect the interglacial forest environment with Elephas antiquus, Stephanorhinus kirchbergensis, Equus mosbachensis, bear, deer, pig etc. Among the organic remains, wooden artefacts made of Abies alba were found. Three of those display artificial notches possibly used for hafting stone tools. Layer 2, the upper horizon of the Schöningen 12 sequence, comes from a phase of climatic deterioration, shortly after the climatic optimum of the "Reinsdorf" (i.e. Holsteinian) Interglacial. A scatter of burnt wood occurred here, thus indicating a possible fireplace, along with stone artefacts (fig. 89 - G, first piece in upper row) and bones.

The upper horizons of Cycle II produced the Schöningen 13 II-4 site, famous because of the wooden implements (3 spears of Pinus silvestris and 1 throwing stick of Picea) found here along with stone artefacts and skeletal remains of horses which made up 96 % of all faunal remains. Some of the stone artefacts (fig. 89 - H) show thoroughly retouched scraper edges, resembling Middle Paleolithic retouch technique. Convergent scrapers, alternating scrapers and simple side scrapers evoke a certain dregree of tool standardization. The Schöningen 13 II-4 site has since been interpreted as a specialized horse hunting locale, thus one of the earliest examples worldwide. Large herds of horses must have populated the steppe landscape of the so-called Reinsdorf-Interstadial B several thousands of years after the climatic optimum of the "Reinsdorf" (i.e. Holsteinian) Interglacial. A lake was located at the Schöningen Cycle II-channel/basin serving as a water source for the animals. Most interestingly, the artefacts (all made of flint from the Elsterian gravels) were produced elsewhere and then imported, used and rejuvenated at the site, as indicated by 1500 retouched chips (Thieme 2007, 143).

Outside Central Germany there is one more candidate for the OIS 9 Interglacial, probably the Holsteinian: The Kartstein travertine complex near Mechernich in southern Northrhine-Westfalia. Here, in 1977 H. Löhr discovered 31 artefacts of quartz and quartzite (flakes, partially made by bipolar anvil technique, cores) in the travertine which was radiometrically dated to around 300,000 (overview: Vollbrecht 1997, 202-13).

The mentioned Holsteinian campsites, rich in artefacts, occur in Central Germany at the end of the Lower Palaeolithic. The chronological stage following after OIS 9, the first glacial stage of the Saale-Komplex (Fuhne Glacial OIS 8) probably saw the beginning of the Middle Palaeolithic, which is represented by the famous early Middle Palaeolithic site of Markkleeberg near Leipzig. The Markkleeberg assemblage yielded handaxes and other bifacial tools along with a Levallois flake industry. By stratigraphic evidence, the Markkleeberg finds come from a cold phase which must be older than (or at the very beginning of) the maximum extension (Drenthe glacial stage of OIS 6) of the Saalian Ice sheet. This means that an early OIS 6 stage must also be considered a second chronological alternative for Markkleeberg. Chronology, typology and technology of Markkleberg fit well to Western European Acheuléen superieur sites, all belonging to the early Middle Palaeolithic.

Discussion

The French (Middle) Acheulean began at around OIS 15 (Abbeville "Carrière Carpentier") and lasted to OIS 9 (Cagny "l'Épinette"), thus stretching over 300,000 years (Tuffreau *et al.* 1997). The Terra Amata assemblages belong to the same long time period.

For a long period within this time range Central European evidence is poor and does not allow for cultural attributions, with the possible exception of some handaxes from Kärlich Seeufer.

The last stage of the French Middle Acheulean, however, falls into the same time range (OIS 10/9) as the series of Central German Lower Palaeolithic sites. The new chronological hypothesis (OIS 9) for the Schöningen-Bilzingsleben group of sites suggests contemporaneity with the formation IV of Cagny-l'Épinette. The principal Acheulean occupation of Cagny l'Epinette I1 dates to the climatic optimum of the Holsteinian and must thus be considered to be contemporaneous to Bilzingsleben, Schöningen 13-I and Schöningen 12, all lacking typical handaxes. The slightly younger Acheulean assemblage of Cagny l'Épinette H comes from the same time range as the spear-site of Schöningen 13-II-4 (OIS 9 final phase).

The lithic industries of the Schöningen-Bilzingsleben group, though comprising some small bifacial pieces at Bilzingsleben, do not display any traces of façonnage but clearly focus on the débitage concept of lithic production. It must also be noted that the débitage systems are obviously very heterogenuous and do not belong to one and the same technological tradition.

Beyond cultural tradition, two different factors might have caused the absence of façonnage in the German Lower Palaeolithic: Raw material availability and land use patterns.

a) Raw material availability

At Schöningen, silex from the underlying Elsterian moraine was available, at Bilzingsleben the same silex raw material had to be aquired from some distance. This caused the intensive reduction of the Bilzingsleben silex artefacts, which contrasts larger dimensions among the non-silex artefacts from the same site. South of the area once covered by the Elsterian ice shield, the raw material situation was even worse, silex missing or being available only in low quantities. Quartzite, quartz, lydite and other raw materials were used instead, which were even less adapted to the production of bifaces.

b) Land use patterns

As a second factor causing the inferred absence of Acheulean bifacial tool tradition, land use patterns must be taken into account. It has been stated several times that handaxe production and flake production might have taken place at distant sites within the same land use system. This would explain the abundance of isolated finds of handaxes (Conard 2003) which might predominatly be used outside the camp sites, during some off-site activities. At Soucy, some specific observations have recently indicated that indeed such a differentiation might have existed. Three kinds of sites have been documented (Lhomme *et al.* 2004, 720):

– Sites with handaxes, any productional remnants missing. The handaxes were produced elsewhere, were then imported to the site and then discarded. All tools found at the site were made of flakes (Soucy 5, level I).

– Site with remnants of flake production, found along with chips from bifacial trimming, but no handaxes found. Some handaxes had been produced at the site and exported elsewhere for future use (Soucy 5, level II).

– Sites with handaxes, all parts of the bifacial productional chain, along with unifacial tools made of blanks from flake production (Soucy 1) or from side-products of bifacial production (Soucy 3).

The OIS 9 examples from Soucy show that handaxes (and the connected façonnage principle of production) on the one hand and flakes on the other hand (and the connected débitage principle of production) each played a specific role within the mobility and land use system of that time. This easily allows for sites with and without handaxes, both belonging to the same cultural unit. Future research must tackle the question if such land use systems are to be expected in the German Lower Palaeolithic as well.

Presently, we know some isolated finds of handaxes which resemble French Middle Acheulean examples by shape and technological atttributes. These pieces, although lacking secure contexts might well be candidates for a true German Middle Acheulean. The following two pieces were deliberately selected from a larger number of similar cases:

The large biconvex quartzite handaxe from Hochdahl (fig. 91 - B) was found in 1927 along with a massive quartzite cleaver and a quartzite flake (Veil 1978, 39). The finds came from a gravel layer below a loess horizon. Reindeer, mammouth, wholly rhino and cave bear were also attested at the

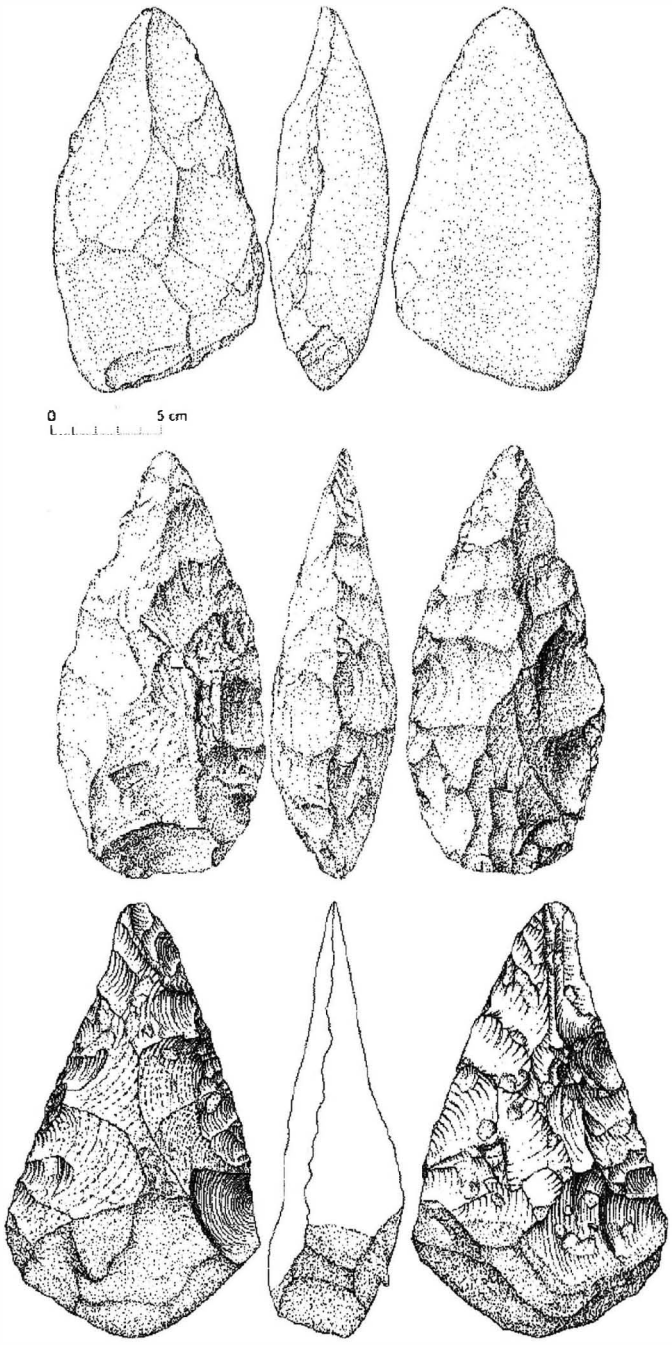


Figure 91: *Some handaxes from Germany. Certain Lower Palaeolithic: Kärlich-Seeufer/Mayen-Koblenz (A - upper row; after von Berg in Fiedler, ed. 1997, 253); by typological and technological comparison of possible Lower Palaeolithic date: Hochdahl/Mettmann (B - middle row, after Veil, ed. 1978)) and Bad Salzuflen/Bielefeld (C - lower row; by the author).*

same site, but their association with the artefacts remained unclear.

The lydite handaxe from Salzuflen (fig. 91 - C) has only recently been found during construction activities on the banks of the Werre River in Eastern Westphalia. The Salzuflen example displays a particular combination of scraper-like working edges along with edges resulting from fine, alternating bifacial thinning. The same combination has been observed for some handaxes from Soucy.

The question arises whether Schwabedissen's statement is truly correct, saying that all handaxes found in Germany should be automatically considered Middle Palaeolithic specimens. With the Soucy case in mind, it may well be possible that Lower Palaeolithic handaxes are hidden among hundreds of isolated or undated finds of handaxes in Germany.

Conclusion

1. Earliest Acheulean occurences in Europe lack any counterpart in Central Europe, as there is no certain evidence for human presence before 600,000 (OIS 15), and assemblages between 600,000 and 400,000 (OIS 11) are of obscure character or simply two small to judge on their typological or technological affiliations.

2. Kärlich, a Middle Rhine site of OIS 11, delivered handaxes (although not very typical) and thus might indicate relations to the Western European Acheulean. Kärlich is the only securley dated site in Germany matching the chronological position of the Terra Amata sequence.

3. Most of the German Lower Palaeolithic sites belong to the last stage of the lower Palaeolithic (OIS 10/9), the late Elsterian Glacial and the Holsteinian (and/or Reinsdorf) Interglacial, thus being younger than the Terra Amata sequence. In these assemblages flake-and core-industries prevail almost exclusively.

4. Recent Research in France (Soucy) has underlined the specific, differentiated functional values of façonnage and débitage products within the same cultural system.

5. Isolated find of handaxes might indicate functional variants of the same, highly differential (Acheulean) land use pattern, as it was observed in Western Europe.

6. The former existence of a true Acheulean cultural context during OIS 10/9 cannot be safely excluded at the present state of research. Vice versa, the existence of a separate "microlithic complex" or "Clactonian" in Germany is still lacking reliable evidence.

Future research needs a detailed technological survey of all existing handaxes in Germany, a comparison with stratified Western European specimens (see Moncel 2010), an investigation of existing OIS 10/9 flake industries of the Schöningen-Bilzingsleben group with special attention on the possible existence of remnants of bifacial trimming within these assemblages and an overall approach in order to reconstruct mobility systems, land-use patterns and systems of raw material acquisition (this paper presents a selection of sites; for a more complete listing, see Haidle/Pawlik 2010).

Bibliographie

BAALES Michael, OLAF Jöris, ANTJE Justus & WIL Roebroeks, Natur oder Kultur? (2000): Zur Frage ältestpaläolithischer Artefaktensembles aus Hauptterrassenschottern in Deutschland. *Germania* 78, 2000, 1-20.

BAALES Michael (2006): Der Weg zum Neandertaler: Aspekte zur Ältesten Besiedlung Afrikas und Eurasiens. In: G. Uelsberg & S. Loetters (eds.), Roots. Wurzeln der Menschheit. Mainz: *Ph.v.Zabern*, 2006, 53-82.

BEHRE Karl-Ernst (2012): Die chronologische Einordnung der paläolithischen Fundstellen von Schöningen. *Mainz – Römisch-Germanisches Zentralmuseum*, 2012.

BOSINSKI Gerhard & RICHTER Jürgen (1997): Paläolithikum und Mesolithikum. *Geschichtlicher Atlas der Rheinlande, Beiheft* II/1, 1997.

BURDUKIEWICZ Jan Michal (2003): Technokompleks mikrolityczny w paleolicie dolnym srodkowej Europy. *Wroclaw* 2003, 373p.

CONARD Nicholas J. (2003): Handaxes on the landscape and the reconstruction of Paleolithic settlement patterns. Erkenntnisjäger. Kultur und Umwelt des Frühen Menschen. Festschrift für Dietrich Mania. *Veröffentlichungen des Landesamtes für Archäologie Sachsen-Anhalt - Landesmuseum für Vorgeschichte*, volume 57, II, Halle 2003, 123-144.

FIEDLER Lutz (ed.) (1997): Archäologie der ältesten Kultur in Deutschland. *Materialien zu Vor- und Frühgechichte von Hessen*, vol. 18, 1997, 392 p.

FIEDLER Lutz, JENS Lorenz Franzen (2002): Artefakte vom altpleistozänen Fundplatz "Dorn-Dürkheim 3" am nördlichen Oberrhein. *Germania* 80, 2002, 421-440.

EISSMANN Lothar (1994): Grundzüge der Quartärgeologie Mitteldeutschlands. In: Lothar Eissmann & Thomas Litt (eds.) Das Quartär Mitteldeutschlands. *Altenburger Naturwissenschaftliche Forschungen*, vol. 7, 1994, 55-135.

GAUDZINSKI Sabine (1996): Kärlich-Seeufer. Untersuchungen zu einer altpaläolithischen Fundstelle im Neuwieder Becken (Rheinland-Pfalz). *Jahrbuch des Römisch-Germanischen Zentralmuseums Mainz*, vol. 43, 1996, 3-239.

GEYH Mebus A., MULLER Helmut (2005): Numerical ^{230}Th/U dating and a palynological review of the Holsteinian/Hoxnian Interglacial. *Quaternary Science Reviews* 24, 2005, 1861-1872.

HAIDLE Miriam N. and PAWLIK Alfred F. (2010): The earliest settlement of Germany: Is there anything out there? *Quaternary International* 223-224, 2010, 143-153.

JORIS Olaf et BAALES Michael (2003): Zur Altersstellung der Schöninger Speere. In: Erkenntnisjäger. Kultur und Umwelt des Frühen Menschen. Festschrift für Dietrich Mania. *Veröffentlichungen des Landesamtes für Archäologie Sachsen-Anhalt – Landesmuseum für Vorgeschichte*, volume 57, I, Halle 2003, 281-288.

KRAFT Ingo (1994): Studien zur Kultur und Umwelt im Mittelpleistozän Europas. Universitätsforschungen zur *Prähistorischen Archäologie*, vol. 24. Bonn: Habelt 1994, 186 p.

LAURAT Thomas (2003): Bifaziale Geräte im Altpaläolithikum Mitteldeutschlands. Erkenntnisjäger. Kultur und Umwelt des Frühen Menschen. Festschrift für Dietrich Mania. *Veröffentlichungen des Landesamtes für Archäologie Sachsen-Anhalt – Landesmuseum für Vorgeschichte*, volume 57, II, Halle 2003, 357-361.

LHOMME Vincent, CONNET Nelly, CHAUSSE Christine, BEMILLI Céline, BAHAIN Jean-Jacques, VOINCHET Pierre (2004): Les sites et les industries lithiques du Paléolithique inférieur, moyen et supérieur de la basse vallée de l'Yonne dans leurs contextes chronostratigraphiques. *Bull. Soc. Préh. Franc.* 101, 2004, 701-739.

LITT Thomas, BEHRE Karl-Ernst, MEYER Klaus-Dieter, STEPHAN Hans-Jürgen & WANSA Stefan (2007): Stratigraphische Begriffe für das Quartär des Norddeutschen Vereisungsgebietes. Eiszeitalter und Gegenwart. *Quarternary Science Journal* 56, 2007, 7-65.

MANIA Dietrich (1997): Altpaläolithikum und frühes Mittelpaläolithikum im Elb-Saale-Gebiet. In: Lutz Fiedler (ed.), Archäologie der ältesten Kultur in Deutschland. *Materialien zu Vor- und Frühgechichte von Hessen*, vol. 18, 1997, 86-194.

MONCEL Marie-Hélène (2010): Oldest human expansions in Eurasia: Favouring and limiting factors. *Quaternary International* 223-224, 2010, 1-9.

ROEBROEKS Will (2001): Hominid behaviour and the earliest occupation of Europe: an exploration. *Journal of Human Evolution* 41, 2001, 437-461.

SCHAFER Dieter (1993): Grundzüge der technologischen Entwicklung und Klasifikation vor-jungpaläolithischer Steinartefakte in Mitteleuropa. *Bericht der Römisch-Germanischen Kommission*, vol. 74, 1993, 49-193.

SCHWABEDISSEN Hermann, (1970): Zur Verbreitung der Faustkeile in Mitteleuropa. In: Gripp, Karl, Schütrumpf, Rudolf und Schwabedissen, Hermann (eds.) Frühe Menschheit und Umwelt, Teil 1, *Archäologische Beiträge. Fundamenta* A2, Köln-Wien 1970, 61-98.

SORIANO Sylvain, (2000): Outillage bifacial et outillage sur éclat au Paléolithique ancien et moyen: coexistence et interaction. *Thèse de doctorat, Université Paris X* – Nanterre, 2000.

THIEME Hartmut (ed.) (2007): Die Schöninger Speere. Mensch und Jagd vor 400,000 Jahren. *Stuttgart-Hannover* 2007, 247 p.

TUFFREAU Alain, LAMOTTE Agnès, MARCY Jean-Luc (1997): Land use and site function in Acheulean complexes of the Somme valley. *World Archaeology* 29 (2), 1997, 225-241.

TURNER Elaine (2000): Miesenheim I: excavations at a Lower Palaeolithic site in the Central Rhineland of Germany. *Monographien des Römisch-Germanischen Zentralmuseums Mainz*, vol. 44, Mainz.

VEIL Stephan (1978): Alt- und Mittelsteinzeitliche Fundplätze des Rheinlandes. Köln-Bonn: *Rheinland-Verlag/Habelt* 1978, 196 p.

VOLLBRECHT Jürgen, (1997): Untersuchungen zum Altpaläolithikum im Rheinland. *Universitätsforschungen zur Prähistorischen Atchäologie*, vol. 38. Bonn: Habelt 1997. 262 p.