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Mesolithic-Neolithic Interactions - The Lithic Industry of the Earliest Bandkeramik Culture Site at Friedberg-Bruchenbrücken, Wetteraukreis (West Germany)

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The excavation of the Earliest Bandkeramik Culture (LBK) site at Friedberg-Bruchenbrücken, Wetteraukreis, was conducted in the years 1984 and 1985. The campaigns are part of a long-term research project by the Seminar für Vor- und Frühgeschichte of the University of Frankfurt (Lüning 1984, 1986, 1987; Lüning, Kloos and Albert 1989). A total of twelve sites, which all yielded pottery of phase I of the Bandkeramik Culture (Quitta 1960; Meier-Arendt 1966), were excavated. Sites surveyed nearby such as Goddelau, Gambach, Nieder-Eschbach and Bad Nauheim-Steinfurth (Kneipp and Langenbrink, in print) also yielded lithic material of which analysis is currently under way.

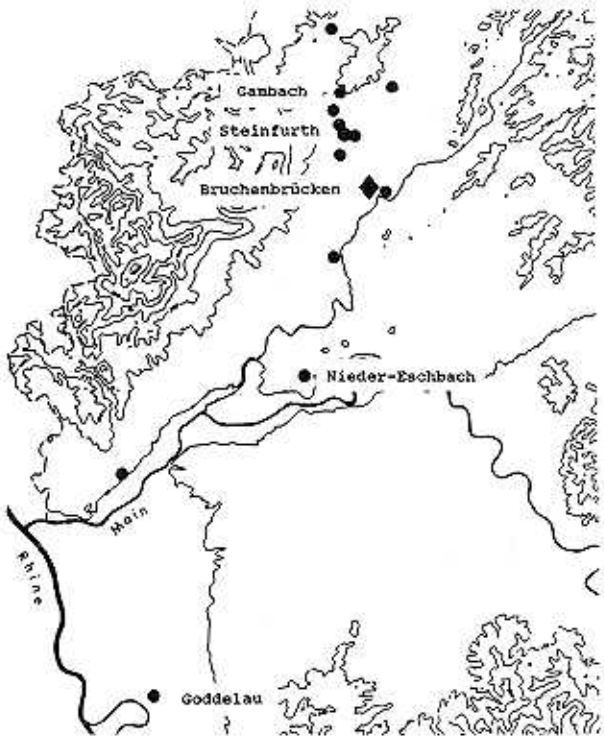

Figure 1: Bruchenbrücken. Location of settlement and surrounding sites of oldest Linienbandkeramik period in the Wetterau region (modified after Meier-Arendt 1966).

Bruchenbrücken (BB) lies in the Wetterau region, a hilly loess-covered area surrounded by the Taunus and Vogelsberg massifs (fig. 1). Today the Wetterau is characterised by a relatively mild, dry climate. Rainfall is between 550-600 mm per year, mean temperature is near 9° C.

The settlement was erected on a slope falling away to the south east about 1.5 km west of the confluence of the Nidda and Wetter (fig. 2). Seven house sites can be dated to the earliest phase (BB I), house 1 is most likely attributable to a younger one (BB II-V, chronological phases after Meier-Arendt 1966). According to the pottery analysis the site was inhabited during the entire timespan of the Early Neolithic period with a possible hiatus between phases I and II. Middle Neolithic and Bronze Age features were also explored.

Flint Artefacts

The analysis of the lithic material is hampered by the dense occupation of the excavated area. Thus infiltrations of younger material into older features and vice versa are possible. However, the former seems to have occurred only rarely, whereas some of the older material was deposited in younger pits when these were dug. Therefore the percentages presented for the younger LBK lithic industry might have to be changed slightly in the course of further research, since most of the flint artefacts cannot be dated by themselves. Data from phase I though is fairly reliable. 512 flint artefacts larger than 5 mm and 628 from 5 to 2.5 mm were excavated from the site. The large proportion of small artefacts (fig. 3), unusual for Early Neolithic inventories, is due to screening for botanical analysis during the excavations (Kreuz 1988).

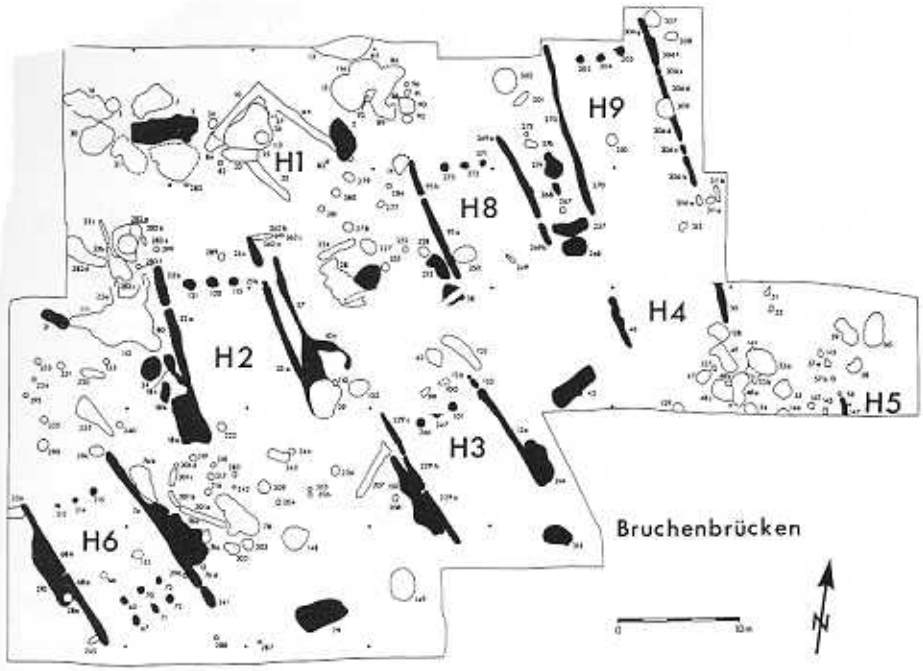

Figure 2: Bruchenbrücken. Settlement plan, features of phase I of Bandkeramik culture are shaded black.

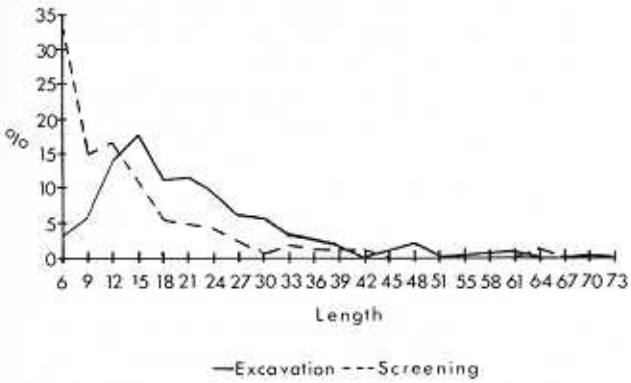

Figure 3: Bruchenbrücken. Diagram of total length of artefacts according to excavation technique.

Raw Material

In total 42 different raw materials could be identified. These were grouped according to their provenance:

- West European Cretaceous Flint from the Maas valley region (Löhr, Zimmermann and Hahn 1977; Deecke 1933). Several varieties occur. Mainly flint from Rijckholt, Vetschau and an unusual material, most likely originating from the Lousberg, Kr. Aachen (Weiner 1984).
- Erratic Cretaceous Flint (Deecke 1933)
- arieties from South-West-Germany. In this group the so called "Wittlinger Trümmerkalk", a just recently recognized variety of Jurassic Hornstone which derives from a source near Wittlingen, Kr. Fildern at the bluffs of the Schwäbische Alb (H.-Ch. Strien 1983/84), is the most numerous material.
- Plattenhornstein from Abensberg-Arnhofen, Ldkr. Kelheim (Engelhardt and Binsteiner 1988)
- local siliceous rocks
  Among these are Quarzites from Hesse, Black Radiolarian Chert (Lydite) (Buttler 1930; Deecke 1933) and Jurassic Hornstones possibly transported along the Main (Schirmer 1981).

During the Bandkeramik occupation of the site which lasted for about 600 years, these materials were used in different quantities (fig. 4).

It can be demonstrated that during phase I cretaceous flint reaching the Wetterau from the Maas valley represents 80 % from the total material. At this time local material was represented with 4,6 %, chert from Abensberg-Arnhofen is very rare (0,4 %), while chert from the Neckar valley accounts

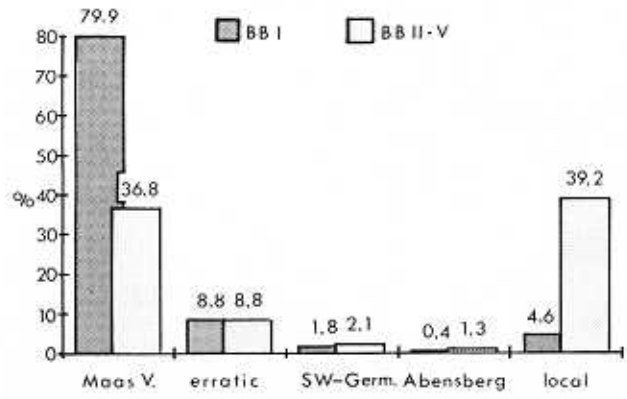

Figure 4: Bruchenbrücken. Raw materials.

for about 2 %. This picture changes dramatically from phase II onwards. Now the proportion of local material is about 39 % whereas flint from the Maas Valley decreases to 36,8 %. The amounts of Erratic Cretaceous Flint or Abensberg-Arnhoven Chert remain the same.

During the oldest LBK 95,4 % of the lithic material comes from areas which are about 200 km away from Friedberg-Bruchenbrücken.

Analysis of Lithic Technology

In phase I about 65 % of the flint from the Maas valley are at least partially covered by cortex. This, as well as cores of Lousberg and Vetschau Flint (fig. 5, 1-2) demonstrate that the material was worked at the site, and so brought there more or less unworked. The Erratic Cretaceaous Flint also seems to have been worked in Bruchenbrücken. None of the other material is represented with cores or primary debitage.

A remarkable result was provided by the analysis of striking platforms on flakes and blades. A comparison of different platform modifications between younger LBK inventories and those of the oldest LBK from Bruchenbrücken revealed a much higher percentage of primary facetted striking platforms (by a primary facetted striking platform we mean a platform that shows the negative bulbs of reductive modification, a secondary facetted striking platform does not show these negative bulbs at all. For a detailed description see Zimmermnann 1989). Since up to this point no comparative analysis had been undertaken on Late Mesolithic flint material, the inventories of layers 6 and 7 of the Jägerhaus rockshelter (Taute 1975) were also studied. This material revealed almost the same high proportion of primary facetted striking platforms as in the Earliest LBK assemblages (fig. 6). The careful modification of platforms can also be observed on cores of both periods (Gehlen 1988: fig. 5, 2). This fine technique, which was conducted normally each time before a flake or blade was struck off, must have been a preparation of great importance for the quality of the resulting product.

Research by R. Bauche (1987) on quantification of the Mesolithic complexes showed a remarkable increase of regular blades in the Late Mesolithic layers, a fact which was first noticed by J.G.D. Clark (1958) and now can be expressed numerically. The methods of measuring regularity proposed by R. Bauche were used on the material from Bruchenbrücken. The result was a high amount of very regular blades in phase I. These data were then combined with those of R. Bauche. Fig. 7 shows clearly an increasing portion of regular blades from the Beuronien C inventory of the Jägerhaus rockshelter, layer 8 up to the oldest LBK. During the younger LBK blade technology seems to have degenerated since the percentage of regular blades decreases again. The combination of these two observations, the high amount of primary facetted striking platforms, mainly on blades, and the proportion of regular blades in the Late Mesolithic and Earliest Bandkeramik assemblages should be the result of an identical blade technology at this time. One is reminded of the antler tines which are interpreted as implements for pressure flaking and occur quite numerously during this period (Cziesla and Tillmann 1984). It would seem that the striking platform was elaborately facetted not only for stabilization but also in order to roughen the surface so that a tool of organic material would not slip. Yet whether these antler tines were indeed used as pressure tools cannot be decided definitely. It is also quite possible that they were used as punches. In any case the result was a fine blade which showed very little curving, almost no bulb, with parallel sides and parallel dorsal ridges (fig. 5, 5-9). Blades of this kind are a vital premise for the production of the typical Late Mesolithic regular trapezes.

At Bruchenbrücken it seems quite possible that most of the regular blades were snapped near the bulb, the resulting blade portions were then worked over by retouching the broken edge. Other ways of dissection were the so called "Kerbschlag"-technique (Taute 1972/73) where the blade was broken at a prepared notch (fig. 5, 3).

Of note is the so called "burin transversale" mentioned by D. Binder (1987). This technique seems not to have been restricted to southern French complexes. The same modification is to be recognized at various contemporary sites (Paunescu 1988; Gehlen 1988) and goes as far back as Beuronien C. Several pieces from Bruchenbrücken show this modification (fig. 5, 5: 10,11).

The predominance of blades over flakes is demonstrated by almost equal percentages of the latter versus the former. Other, younger LBK sites generally show a higher percentage of flakes over blades (fig. 8). This hypothesis is yet to be supported by research at other sites of the Earliest Neolithic period. The predominance of blades might also result from the raw material sources being so distant.

Tools

The proportion of tools (19 %) of both the Earliest and the Younger LBK also reflect the distance to the raw material sources. Interesting is the relative abundance (15 %) of arrowheads compared to many of the sites of the Early Neolithic of Danubian tradition. Sites of the western

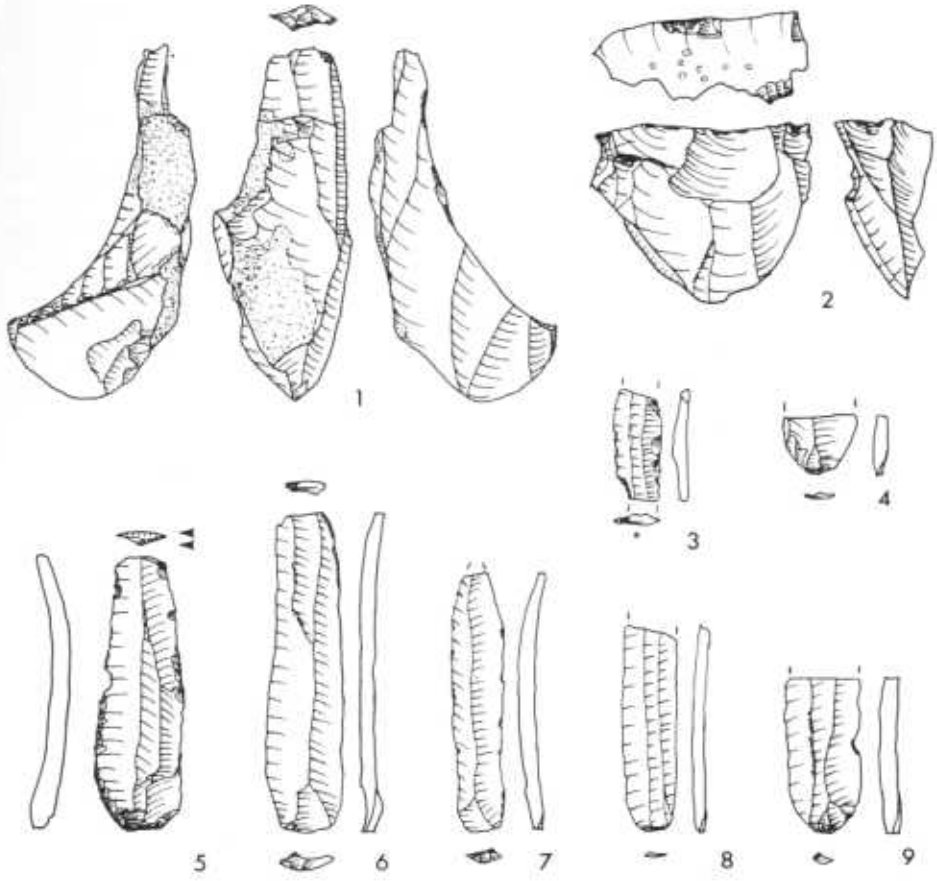

Figure 5: Bruchenbrücken. Cores and blades. 1: Vetschau flint; 2: Lousberg flint; 3: Yellow Jurrassic hornstone, 4: Lousberg flint; 5: Rijckholt flint; 6: Erratic flint; 7: Rijckholt flint; 8: Rijckholt flint; 9: Lousberg flint.

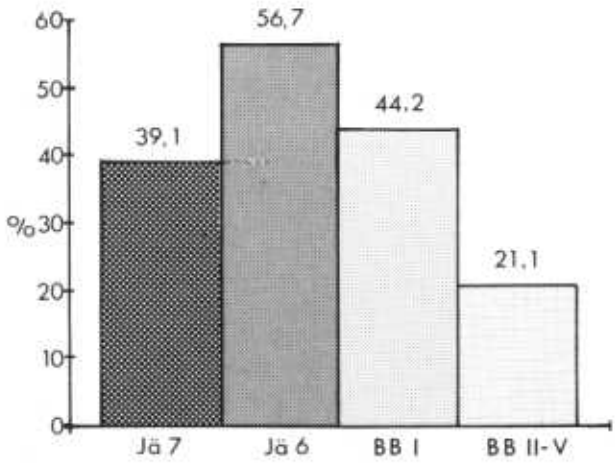

Figure 6: Bruchenbrücken. Amount of primary facetted striking platforms in Late Mesolithic Jägerhaus and Linienbandkeramik assemblages of Bruchenbrücken and general younger material of phases II-V.

territories of the LBK show generally higher percentages of arrowheads (Milisauskas 1986), yet in the Lower Main area a rate of about 4 % is common in phases II-V. Whether this proportion of arrowheads derives from a stronger dependance on hunting has yet to be shown by the results of the analysis of the bone material. Yet interesting to note is the corresponding small percentage of sickle blades (fig. 9).

Borers are thought to be numerous on oldest LBK sites (Kozłowski and Kozłowski 1978), a hypothesis that can be confirmed by the material from Bruchenbrücken. This might be due to the production of quartz pearls (fig. 10) formerly attributed only to Middle Neolithic assemblages. Similar stone pearls were also recovered from the oldest LBK site of Goddelau (Willms 1984) and have been recovered at Gaimersheim, were Earliest LBK pottery was also found (Weinig 1989). These pearls resemble those of *Spondylus* shell commonly known from Bandkeramik sites (Willms 1985). Yet no pearl preforms were uncovered in Bruchenbrücken, so that there might be other reasons for the high amount of borers.

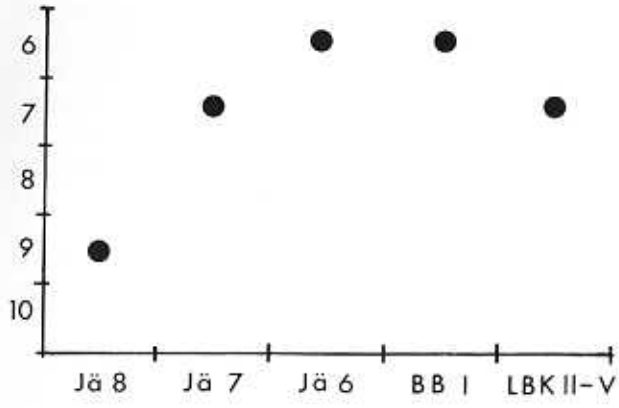

Figure 7: Bruchenbrücken. Degree of parallelity of blades in Late Mesolithic Jägerhaus and Linienbandkeramik assemblages of Bruchenbrücken and general younger material of phases II-V. The modus of the histogram of percentages of different degrees in parallelity in each complex is given. Numbers represent increasing parallelity, number 6 would be equal to a blade as in figure 5, 8-9.

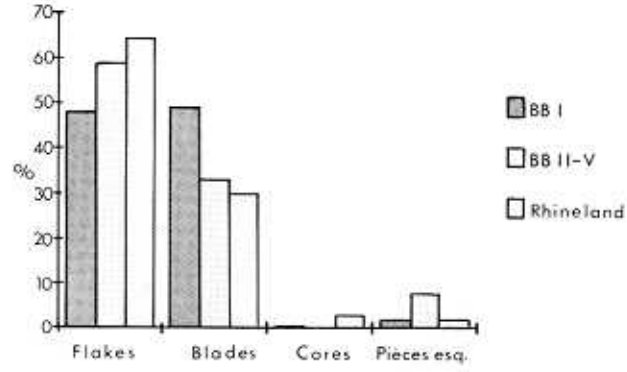

Figure 8: Bruchenbrücken. Category percentages.

Discussion of Chronology

A stable chronological framework is of major importance for the problem of the interrelationship between the Mesolithic and Neolithic. Unfortunately there are still only few ^{14}C-dates from Late Mesolithic sites in Central Europe, and the situation is not much better for Northern France and Belgium. Moreover interpretation of the latter dates is complicated by the fact that most of these come from sites on sandy soils where turbation has blurred the stratigraphic situation (Vermeersch n.d.). The same might hold true for certain rockshelters. Recently the amount of ^{14}C-dates of the Earliest Bandkeramik Culture has been enriched by new accelerator dates from Oxford (Hedges, Housley, Law and Bronk 1989). Unfortunately features at Early Neolithic sites can be disturbed by settlement activity or bioturbation as well. In this way small particles of organic material which can intrude into older features and make those seem younger than expected. It is thus necessary to evaluate all dates quite carefully if a solution to this delicate problem is to be attempted.

A list of Late Mesolithic and Early Neolithic dates is given in the appendix. Dates marked with a (*) are thought to be representative for the associated archaeological material.

Dates from Bruchenbrücken all result from Earliest Bandkeramik features yet their timespan reaches well into the early 5th Millenium. The Flomborn phase is thought to begin around 5200 BC in the Rhineland (Lüning 1982) and a little earlier in Hesse. Thus all dates younger than these cannot realistically date the phase I at Bruchenbrücken therefore should be left out; they must be the result of insertion of younger material. Only two reasonable dates exist so far for Goddelau. One date falls within the timespan thought to be realistic for phase I at Bruchenbrücken. However the flint material from Goddelau is composed of larger amount of Jurassic hornstone from Wittlingen and only a few Maas Valley flints. Moreover the ceramics seem to be older than those of Bruchenbrücken (Meier-Arendt 1963) so the earlier date is thought to be representative for at least the majority of the archaeological material from this site. Comparable dates have been obtained from the layer 5 of the Bavans rockshelter. Here also the dates cover a great timespan, yet quite a lot of different material is present in this layer 5. The younger dates might well result from intrusive material from above, while the one date of the late 7th Millenium could result from deeper layers. The dates which would seem to be representative for the lithic industry and the sherds of La Hoguette type lie in the middle of the 6th Millenium and thus are roughly contemporaneous with Goddelau (for a detailed discussion of this attribution see Gronenborn 1990). This hypothesis is supported by the occurrence of La Hoguette sherds and similar triangular point types at Goddelau and Bavans (Lüning, Kloos and Albert 1989; Gronenborn 1990). Figure 11 gives the dating of Bruchenbrücken, phase I, Goddelau and Bavans, layer 5 presently thought to be most realistic. These dates as well as the ones listed in the appendix were calibrated by the method proposed by Weninger (1986). The site of Bruchenbrücken has produced 6 reliable ^{14}C-dates. Weninger suggested to take the 50 % ranges of the histogram as realistic boundaries when a series of dates is to be evaluated. Thus for Bruchenbrücken this method is applied. Since there is only one date from Goddelau and two from Bavans, the results are naturally much more vague.

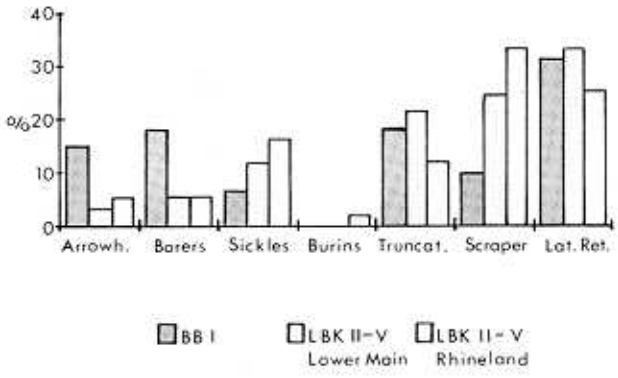

Figure 9: Bruchenbrücken. Tool class percentages.

Conclusion and Interpretation

It could be demonstrated that the material of the earliest LBK complex from Friedberg-Bruchenbrücken in many respects reflects Late Mesolithic traditions. Not only does this hold true for the technique of blade production, but also typological resemblances such as arrowheads and the so called "burin transversale" show a Mesolithic heritage. The production and use of trapezes is doubtless also attributable to Mesolithic tradition.

Regular blades as well as trapezes and "burins transversales" are to be found in varying percentages in almost all assemblages of the time between 6800 and 5250 BC and thus demonstrate only a general affiliation between these two timespans.

This does not hold true for triangular points (fig. 10,1), also known as Bandkeramik Points (Newell 1972) or *points à éperons* (Rozoy 1978) as well as oblique transverse arrowheads (fig. 10,2). The former can easily be assigned to many Late Mesolithic parallels from France and the Benelux countries, and might ultimately be traced back to the triangular points of the Beuronien. With the onset of the Late Mesolithic period these points disappear in Central Europe yet remain present in France and Belgium (Gronenborn 1990, Jacobs 1988). The trapeze with its variations is the prominent arrowhead type in Central and Southeastern Europe (e.g. Tellenbach 1983).

The oblique transverse arrowhead corresponds best to the many known examples of this type which are found distributed in the Northern European flatlands (Vang Petersen 1984).

Both typological links to different regional Mesolithic traditions are reflected by the raw material either from the Maas valley or Erratic Cretaceous Flint. The use of the latter material is not surprising since the area of the Earliest LBK covers the southernmost deposits of this raw material.

Much more bewildering is the high proportion of flint of Maas Valley origin since the source lies about 200 km west of the westernmost extension of the Earliest LBK. If one does not accept the idea of raw material expeditions at the time of the Early Neolithic (Kalis and Zimmermann 1988) the material must have been distributed by people who were not of the Bandkeramik Culture. The occurrence of La Houguette ceramics at all sites on the western border of the Earliest LBK extension provides a solution.

This ware is present at the site of Bavans already mentioned. Here an association with the Late Mesolithic lithic industry is most likely. A similar, but not yet definite situation is to be found at the site of Himeling near Thionville in Lorraine (Belland, Blouet and Leesch 1985). Here several sherds of La Hoguette ware were excavated and a typical Late Mesolithic industry has been located by fieldwalking nearby.

It can thus be concluded that at its western fringes Bandkeramik Culture was in contact with the manufacturers of the La Hoguette ceramic ware from the middle of the 6th Millenium onwards. The contact is demonstrated by La Hoguette sherds and triangular points of Late Mesolithic tradition to be found on Earliest Bandkeramik sites of Friedberg-Bruchenbrücken and Goddelau.

This period of contact lasted for about 250 years until the Bandkeramik Culture started to move west. It seems quite possible that also an economic exchange took place, reflected by the sometimes massive amounts of Maas valley Flint at those sites.

This distribution network was already operating during in the 8th Millenium when small amounts of Vetschau Flint occur as far as 100 km east of the source (Arora 1979). At the same time, and during the Late Mesolithic, Wommersom Quartzite was transported in fairly large amounts over an area some 200-300 km in diameter (Gendel 1982). This network collapsed before the advent of the Bandkeramik Culture in Belgium and the Southern Netherlands. Wommersom Quartzite is known only from a few sites (Zimmermann 1988). The distribution network of Maas valley Flint must have become economically more and more important during this time. Unfortunately up to now there are no sites known between the Upper Rhine valley and the Maas valley which might reflect this process. The Late Mesolithic material from Weidental Cave (Cziesla 1989) does not contain any Maas valley Flint. It could then be quite possible that the expansion of the distribution network happened rather rapidly shortly before the Middle of the 6th Millenium (fig. 12). At Goddelau only a few artefacts of Vetschau Flint are present, yet quite a lot of the material is patinated so that definite data might not be available. What kind of economy supported this network which would produce a

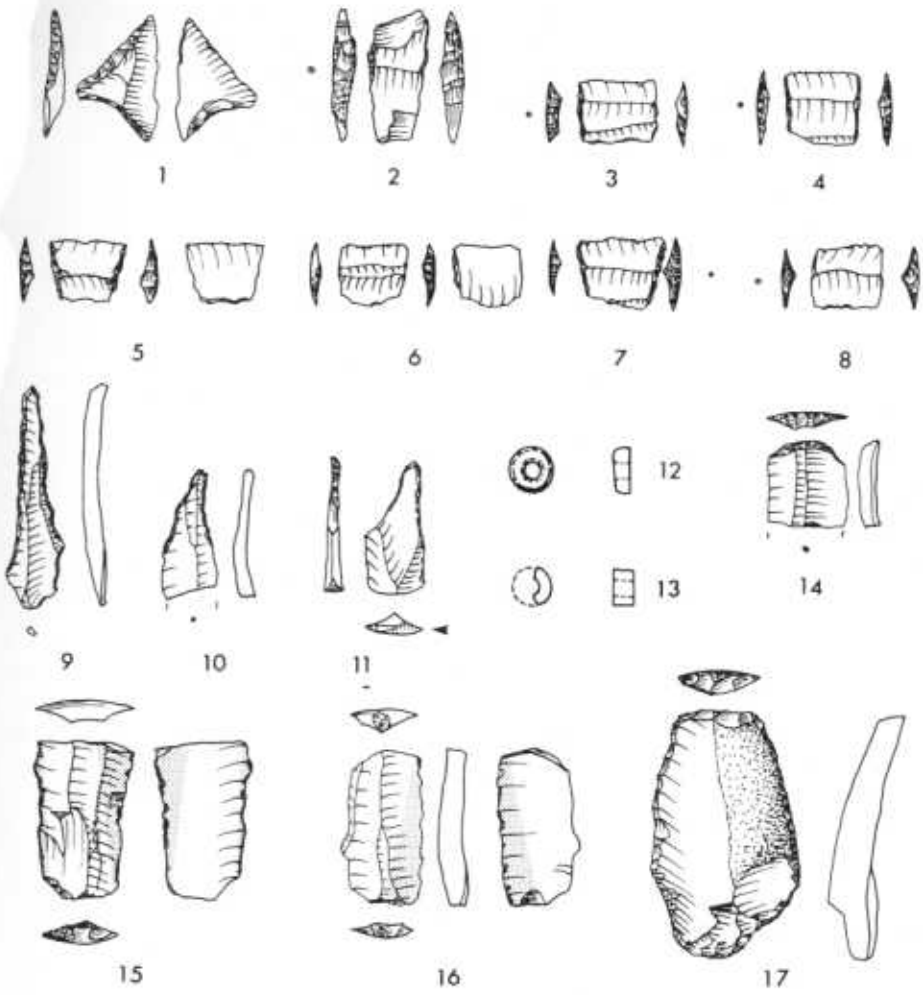

Figure 10: Bruchenbrücken. Microliths, borers, quartz pearls, scrapers and sickle blades. 1: Lousberg flint; 2: burned flint; 3: Wittlinger Trümmerkalk; 4: Wittlinger Trümmerkalk; 5: erratic flint; 6: erratic flint; 7: erratic flint; 8: erratic flint; 9: Lousberg flint; 10: Lousberg flint; 11: Rijckholt flint; 12: quartz; 13: quartz; 14: Wittlinger Trümmerkalk; 15: Rijckholt flint; 16: erratic flint; 17: Rijckholt flint.

proportion of flint of 80 % 200 km from the source? From the data presented it is evident that we are dealing with a society that manufactured pottery which has parallels in southern France (Lüning, Kloos and Albert 1989). Interesting is the occurrence of caprid remains at the Grotte du Coleoptère (Gob 1981). Here layer 5, from which the bones were obtained, revealed a date of about 5850 BC (Lv-718: 7000 ± 120 BP / 5972-5743 BC), yet the same layer also contained a lithic industry which cannot be assigned to this period, thus the stratigraphy must be disturbed. Nevertheless this date seems not too unlikely since there is ample evidence of caprids in Southern France as early as the end of the 7th Millenium BC (Roussot-Larroque 1989; Guilaine, Freises and Montjardin 1984). The discussion of *Hedera* in several Late Mesolithic pollen spectra in Belgium and France as a hint of animal husbandry (Vermeersch n.d.) must also be mentioned. Recent research in Southern France (Planchais 1987) supports this evidence.

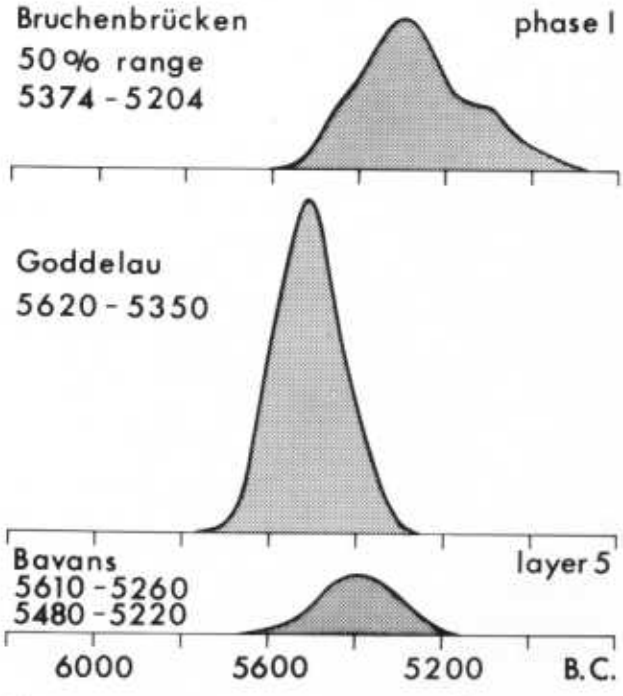

Figure 11: Bruchenbrücken. Calibrated ^{14}C-dates after method of Weninger 1986.

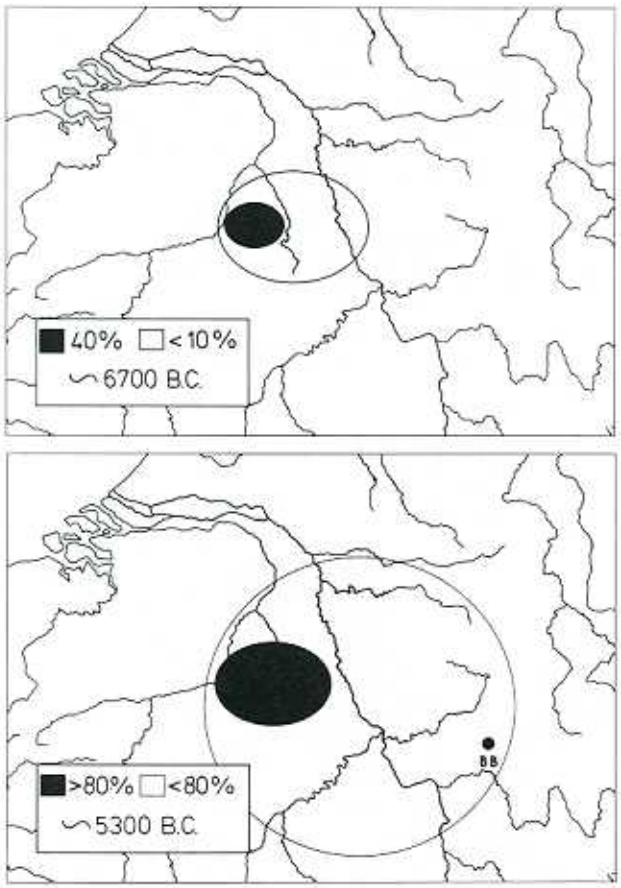

Figure 12: Bruchenbrücken. Hypothetical development of distribution network of flint from the Maas valley sources during Late Mesolithic and earliest Linienbandkeramik periods.

The Terminal Mesolithic in Western Europe, or East Meets West

From the above a Terminal Mesolithic society in France and Belgium that had knowledge of pottery and animal husbandry may be proposed. Such an advanced economy would explain the dynamic expansion of raw material distribution. In Hesse this population was in contact with the bearers of the Bandkeramik Culture at least from the Middle of the 6th Millenium onwards. It was able to halt the expansion of the Neolithic culture of Danubian tradition for about 300 years. With the onset of the Flomborn Phase of the LBK about 5250 BC the area formerly inhabited by the Terminal Mesolithic population was penetrated by the Bandkeramik Culture. At this time rawmaterial distribution of western flint into the Lower Main area began to decrease. Whether this penetration was a proper colonisation or whether a good part of the local population participated in this process and adopted the Bandkeramik way of live cannot be decided definitely at the present time. Yet certain aspects of the material culture such as the triangular points and the way they were manufactured (lateralisation), manifestations on pottery like the "Kammstich"-pointillage technique (Meier-Arendt 1972) last far into the Early Neolithic, and might thus reflect a strong local Mesolithic tradition of Western Bandkeramik Culture.

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Appendix

All Oxa-dates are from Hedges, Housley, Law and Bronk (1989).

Bruchenbrücken, Wetteraukreis		
	BP	BC
*Oxa-1629:	6240 ± 90	5340-4950
*Oxa-1630:	6390 ± 110	5520-5150
Oxa-1631:	4700 ± 110	3633-3355
Oxa-1632:	5410 ± 90	4353-4154
*Oxa-1633:	6190 ± 80	5320-4910
Oxa-1634:	6040 ± 90	5195-4844
*Ki 2598:	6370 ± 90	5470-5220
*Ki 2599:	6370 ± 90	5470-5220
*Ki 2600:	6390 ± 100	5480-5220

Goddelau, Kr. Groâ-Gerau		
	BP	BC
Oxa-1628:	6300 ± 90	65460-5070
*KN-3429:	6600 ± 85	5620 -5350
	BP	A.D.
KN-3430:	1730 ± 65	177-342
KN-3428:	1955 ± 5	46-84

Bavans, layer 5

	BP	BC
*Lv-1590:	6410 ± 95	5480-5220 (Jeunesse 1987)
*Lv-1590:	6500 ± 100	5610-5260 (Jeunesse 1987)
Gif:	5320 ± 120	4450-3820 (Aimé and Jeunesse 1986)
Gif:	4310 ± 90	3290-2620 (Aimé and Jeunesse 1986)
Gif:	7130 ± 70	6080-5740 (Aimé and Jeunesse 1986)