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LITHIC EXCHANGE SYSTEMS DURING THE LBK-POST-LBK TRANSITION: DRAMATIC CHANGE OR CONTINUOUS DEVELOPMENT? A CASE STUDY FROM NORTHWESTERN BAVARIA

ABSTRACT: In the southern part of Germany the lithic raw material procurement from LBK to Post-LBK undergoes a dramatic change – at least at first glance. With the onset of the Post-LBK period lithic assemblages are dominated by raw material from the Arnhofen flint mine in Lower Bavaria – a fine-grained banded tabular chert. The exchange networks of the LBK which had worked for centuries seem to have collapsed. This in turn is interpreted as the consequence of a crisis at the end of the LBK. For some regions, as e.g. northwestern Bavaria (Franconia), even depopulation is assumed. The analysis of flint assemblages from LBK as well as Post-LBK-sites in this area shows, however, that there are continuous developments, which cannot be ignored. While LBK exchange networks stay alive, contacts to Lower Bavaria are intensified, however. This is not only reflected in considerable quantities of tabular chert from Arnhofen, but also in the construction of a rondel which picks up architectural elements characteristic of several rondels in Lower Bavaria. Instead of a dramatic change we have to think about modified supraregional communication networks, which are reflected in Post-LBK material culture.

KEY WORDS: LBK-Post-LBK transition – Lithic procurement systems – Northwestern Bavaria

INTRODUCTION

From a regional point of view, the LBK-Post-LBK transition proceeded in quite different ways. In some regions the archaeological finds reflect a dramatic change (e.g. the Rhineland; Richter 1997: 56–63) while in others continuous developments from the LBK-period are clearly visible (e.g. Saxony; Link 2014). In northwestern Bavaria the onset of the Post-LBK-period (Grossgartach and Roessen) was reconstructed as dramatic change (e.g. Engelhardt 1981: 69, Riedhammer

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2006: 65, 68) based on two arguments: 1. the small number of Post-LBK sites in the archaeological record, 2. the change in material culture especially from the point of view of lithic assemblages. Therefore, a massive depopulation at the end of the LBK was assumed. This model can no longer be substantiated. As S. Suhrbier's detailed analysis of Post-LBK assemblages shows, this region was as densely populated during Post-LBK as it was during LBK (e.g. Suhrbier 2012: 141–142). Further more, the analysis of lithic assemblages from both periods reflects discontinuous but also continuous developments (Scharl 2010). By comparing the underlying procurement strategies from both periods – LBK III–V following Meier-Arendt (1966) and Grossgartach and Roessen – it is possible to draw conclusions on the nature of transition in the area under investigation northwestern Bavaria. In a second step, the results permit a closer look on social structures which are connected to them.

The area under investigation is situated in northwestern Bavaria north and south of the so-called "Maindreieck", a triangle created by the river Main. Today's city of Wuerzburg is located roughly in the middle of the area under investigation, which in the south is approximately limited by today's town of Rothenburg o.d. Tauber, in the north by today's town of Hassfurth i.Ufr. (*Figure 1*). This area is characterized by fertile Loess soils. It was densely populated during LBK and – as mentioned above – Post-LBK. Post-LBK settlements in the area under investigation belong to Grossgartach and Roessen, which are part of the Hinkelstein-Grossgartach-Roessen cultural complex spread in the Southwest of Germany. As in this area the lithic assemblages from both periods seem to reflect a dramatic change of the raw material procurement system, it formed a good basis for analysing what had happened during the LBK-Post-LBK transition

Conclusions on the structure and quality of the procurement system are usually based on the analysis of lithic raw material types used. Hence, in a first step the types of lithic raw material and their geographical sources were determined.

A survey of the local geological conditions and thus the locally available lithic raw material formed an important base for this step. Locally available raw material is assumed to play a vital role in procurement strategies. The area under investigation, however, is characterized by a lack of high-quality chert (*Figure 2*). Locally available chert comes from Triassic deposits – Keuperhornstein on the one hand and Muschelkalkhornstein on the other. Both types of raw material are not suitable for the production of long regular blades, because of inclusions and fissures. Hence, people during the Neolithic had to use more distant sources of raw material if they wanted to produce long regular blades. The next sources of good quality chert which was used during the Neolithic age, are located in the Franconian Jura, in a distance of about 80 to 150 km east and south of the area under investigation, as e.g. Arnhofen tabular chert or Baiersdorf tabular chert. Another source of good quality chert is the Swabian Jura which is at least 100 km away from the area under investigation. Sources of high quality flint are located even more distant, as e.g. different sources of Western flint. Rijckholt flint, for example, was mined near today's city of Maastricht (Gayck 2000: 217). The linear distance between these mines and Northwestern Bavaria is about 400 km. Another type of high quality flint is so-called Baltic flint. This type of raw material is widespread in the Northern part of Central Europe. It was transported to this area from the North by glaciers during the last glacial maximum (Floss 1994: 102). The next deposits lie north of today's city of Erfurt which is about 150 km north of the area under investigation.

Summing up, there was no high-quality chert available within or near the area under investigation but there were several sources of good and high quality chert available within distances of 100 to 400 km.

This result is vital for understanding the composition of flint assemblages from early and middle Neolithic sites in Northwestern Bavaria. A closer look on typical lithic assemblages from the two periods under investigation shows that they are characterized by an extremely varied composition, which indicates the use of quite a number (up to 18) of different types of raw material. This holds true for the lithic raw material from both periods. Interestingly, the assemblages from LBK and Post-LBK sites exhibit different compositions, however. At least at first glance, different types of raw material were used during both periods (see Scharl 2012, 438, Fig. 4). One type of raw material catches the observer's eyes in particular – banded tabular chert from the flint mine of Abensberg-Arnhofen in Lower Bavaria which dominates the Post-LBK assemblages. This type of raw material was quite popular during Post-LBK period and therefore widespread in the southern part of Central Europe (e.g. Lönne 2003: 160, Eisenhauer 2002: 128, Lindig 2002: 119, Mateiciucová,Trnka 2005: 164, Elburg, van den Kroft 2001: 285–288, Strien 2000: 12).

It is this striking change in lithic raw material procurement from LBK to Post-LBK which raises different questions on the nature of the LBK-Post-LBK

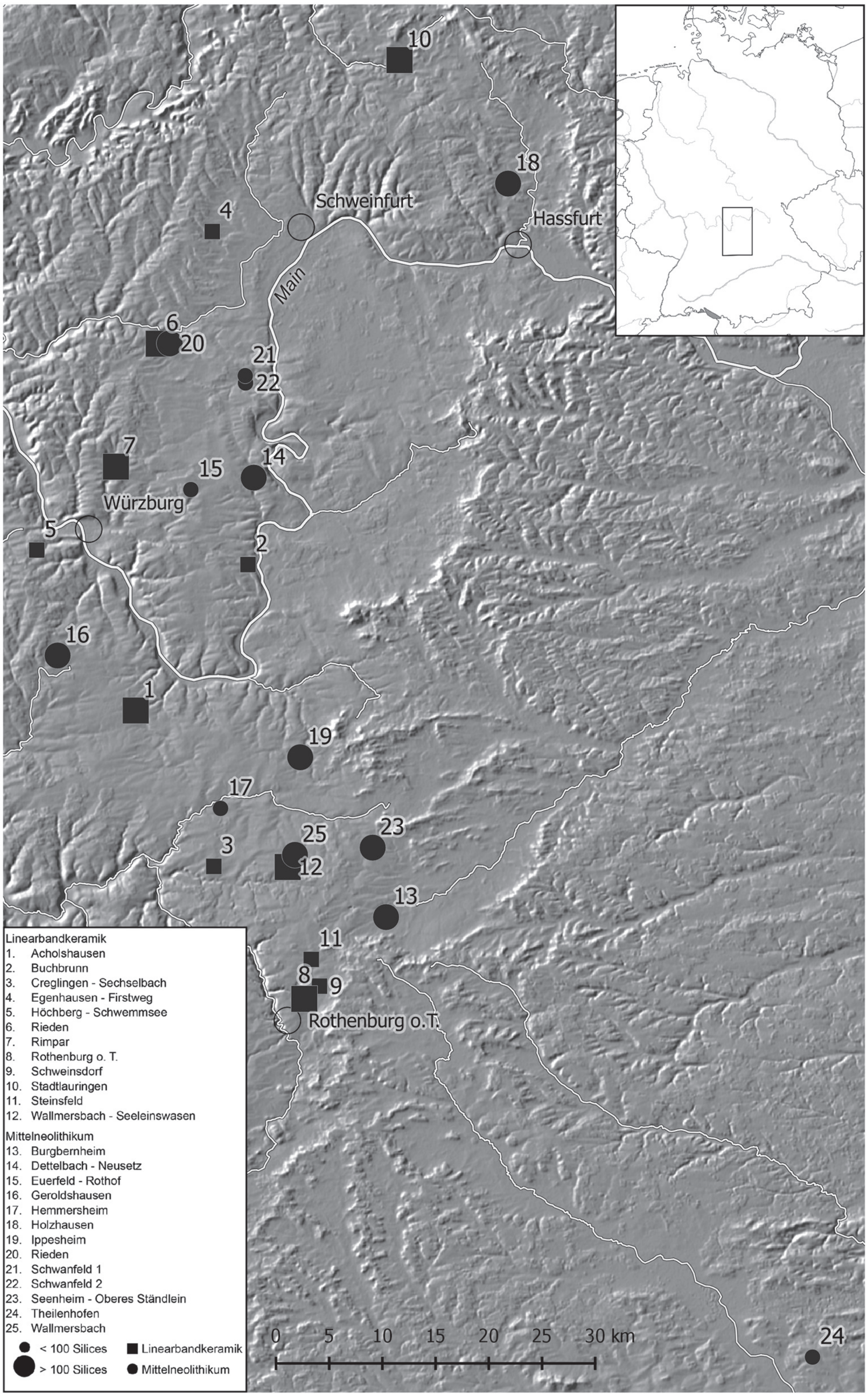

FIGURE 1. LBK (squares) and Post-LBK (circles) sites studied in northwestern Bavaria.

transition. As mentioned above, this change was considered to reflect a dramatic change in communication networks. The exchange networks of the LBK which had worked for centuries seem to have collapsed. This in turn was interpreted as consequence of a crisis at the end of the LBK (e.g. Engelhardt 1981: 69, Riedhammer 2006: 65. 68). For some regions, as northwestern Bavaria (Franconia), even depopulation was assumed. But was this transition really that dramatic?

In order to find out what had happened during the LBK-Post-LBK transition data from 12 LBK and 13 Post-LBK lithic assemblages (*Figure 1*) was collected, considering in particular the types of raw material used

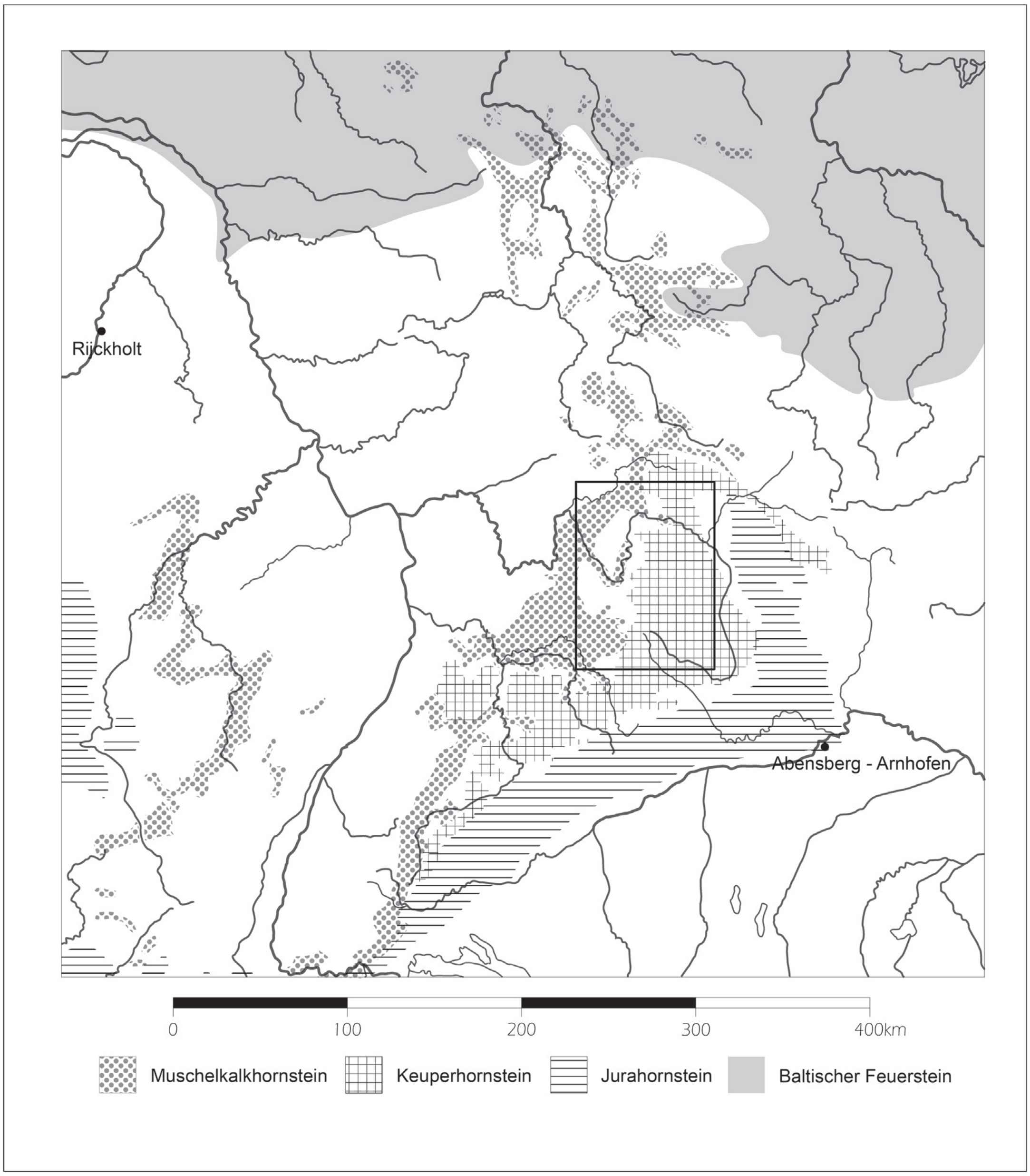

FIGURE 2. Sources respectively distribution area of different types of lithic raw material mentioned in the text (based on Floss 1994). The rectangle marks the investigation area.

and the blanks produced from these. The identification of the types of raw material used in both periods was the basis for determining the direction of contact respectively exchange. The analysis of blank production provided information on the nature of these contacts respectively exchange systems.

A total of 4328 pieces of flint was analysed. As most pieces are surface finds however, strict selection criteria were necessary in order to provide a valid data base. Since surface finds are dated by diagnostic pottery sherds accompanying the lithic find material – the pieces of flint themselves cannot be dated as exactly as sherds –, only assemblages with a clear dating – either LBK or Post-LBK – could be used. Furthermore, only assemblages with more than 50 or even 100 pieces of flint were analysed in order to get a viable data base for quantitative analysis. As a consequence, larger multi-period settlements as well as small hamlets or farmsteads were excluded. This is problematic insofar, as for the LBK period a settlement hierarchy is assumed, consisting of central places, hamlets and farmsteads (Classen 2005: 113–124). For various regions it was possible to connect this settlement system with a hierarchy of raw material supply. Because of the lack of larger multi-period settlements which can often be interpreted as central places and the lack of small hamlets or farmsteads in the data, this hierarchy is only partly documented. Furthermore, as most assemblages have been collected by amateur archaeologists, it was necessary to test the representativeness of each assemblage. This was done by comparing all surface collections with the assemblage of Ippesheim, a Post-LBK site which was searched systematically by a group of students during several prospection campaigns (Scharl 2010: 25–29). The surface of the whole site was divided into 5 × 5 m grid squares and each grid was searched systematically and thoroughly. It was assumed that in Ippesheim each archaeological find – even smaller pieces of flint – was picked up. As the comparison of the amateur archaeologist's collections with the Ippesheim assemblage shows, most of them represent a sample of good to high quality. Other samples could be excluded in this way.

After determining the representativeness of each assemblage the types of raw material used during both periods were analysed. In order to get an idea of the direction and the intensity of the communication networks, the ratio of the different types of raw material within each assemblage was calculated based on the weight of all pieces. In a second step the ratio of pieces with cortex and the blank production were analysed. They enabled conclusions on the nature of the exchange networks and the quality of the procurement systems. In the following, the results will be described separately for both periods:

THE LITHIC PROCUREMENT STRATEGIES DURING LATE LBK

All LBK assemblages are characterized by a high number of different flint raw materials used. Some sites exhibit up to 12 different types of raw material. Since most of them are present in minor proportions, however, all assemblages are dominated by only three types of raw material with higher percentages (*Figure 3*). Jura-chert, Baltic flint and Western flint (Rijckholt flint) come from non-local high quality silex sources. Jura-chert or Jurahornstone was mined in the Franconian Jura located in a distance of about 80 to 150 km. The next deposits of Baltic Flint are located north of the Thuringian Forest, which is about 150 km to the north. Rijckholt flint comes from the area around Maastricht which is located about 400 km to the west. Interestingly, the other types of raw material which were used in only small proportions also come from distant sources, like Wittlinger chert from the Swabian Jura or Tertiaerquarzit from Hesse. Locally available raw material like Muschelkalkhornstein or Keuperhornstein was not or rarely used.

The ratio of the different types of raw material provides an indication of the intensity of contacts in certain directions. As the share of each raw material type shows (*Figure 3*), its amount in a certain assemblage is determined by the distance between site and source of raw material. The next deposits of Baltic flint, for example, are located north of the area under investigation and its proportion in the northern assemblages is higher than further to the south. Jura chert was available in the Franconian Jura which extends parallel to the area under investigation. Therefore, each site is located in a similar distance to this source. This explains the high proportions of Jura chert in almost all assemblages. Rijckholt flint was mined about 400 km to the west. Since the raw material was probably transported to the east or southeast via the river Main, the highest proportion of Rijckholt flint can be found on sites which are situated next to the river. Generally the rivers constitute an important line of communication – the river Main e.g. to the West and to the East. At the same time the latter also represents a boundary between North and South. This is illustrated e.g. by the varying proportions of Baltic flint. As this type of raw material comes from the north it dominates the northern

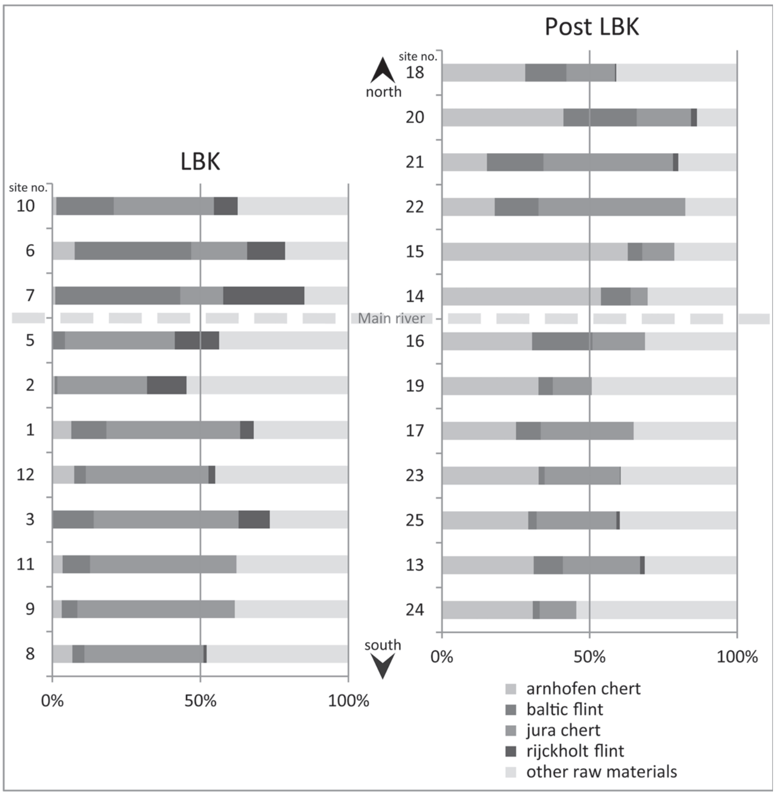

FIGURE 3. Ratio (based on weight per type) of different types of raw material per site – LBK as well as Post-LBK sites are arranged according to their geographical position in the area under investigation.

assemblages and is rarely used in settlements south of the river Main. A closer look reveals, however, that the proportion declines gradually to the south till it reaches the river. The assemblages close to the Main on the northern bank have proportions of up to 17.6%. In contrast, south of the Main the percentage of Baltic flint drops to almost zero. Although the linear distance between the sites north and south of the river does not exceed 10 km the percentage of Baltic flint south of the Main drops to 5.6%.

These results can be further specified by analysing the production of blanks. Two figures are of particular interest:

1. The proportion of blades in most assemblages is remarkably high (*Figure 4*). The average of blades in all LBK assemblages is about 53%.
2. The proportion of pieces with cortex is remarkably low. The average reaches about 13% (Scharl 2010: 136).

What can we infer from these data? For the production of blades the cortex has to be removed from the core first. This first step of reduction produces a high number of flakes with cortex. In a second step, the core has to be prepared further, in order to create a striking platform as well as a ridge for the reduction of the first blade. This second step of preparation produces countless flakes and tiny chips. Compared to this, the proportion of larger flakes and blades is remarkably low. If, on a site, debris and artefacts of the whole chaine opératoire have been conserved, we would expect a high proportion of debris compared to a low proportion of blades or finished artefacts (e.g. Tillmann 1986: 23). As *Figure 4* shows, most LBK assemblages in northwestern Bavaria are characterized by a remarkably low proportion of preparation debris, like flakes and flakes with cortex, while the proportion of blades and finished artefacts is remarkably high, compared to other regions. LBK sites in Western Germany, for example, are characterized by lower percentages of blades which often do not exceed 30% (e.g. Rhineland, Laurenzberg 7, Langweiler 8, Langweiler 16, see Gaffrey 1994: 421). From this we can infer that the production of blades did not take place on site regularly.

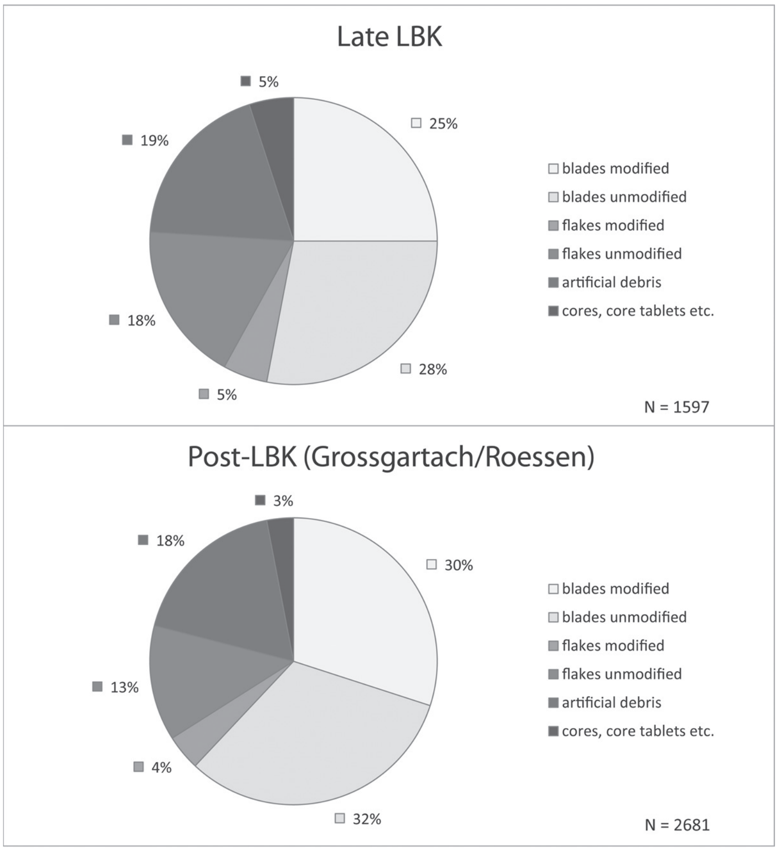

FIGURE 4. Blank production during LBK (above) and Post-LBK (below) in northwestern Bavaria.

If the raw material types are analysed separately, it becomes clear that most types of raw material were not worked on site but somewhere else, probably in settlements nearer to the source of a certain type of raw material (Scharl 2010: 111–114, Fig. 42–44). The LBK settlements in Northwestern Bavaria were mostly supplied with finished blades or even finished tools, since with increasing distance from the source of a raw material the amount of this specific raw material decreases (*Figure 3*) while the amount of blades made from this raw material increases. Simultaneously, the amount of cores and production debris, as e.g. the amount of pieces with cortex, and the size of blades decreases gradually. These results indicate a raw material procurement by down-the-line-exchange – with increasing distance the amount of finished tools rises. This model goes back to C. Renfrew, who worked on trade and exchange systems in prehistoric contexts (Renfrew 1972: 465–471). According to his case studies down-the-line-exchange describes a process in which the spatial distribution of a certain raw material is clearly influenced by the distance to its source. Assemblages next to a specific source of raw material are usually characterized by a proportion of up to 100%. The inhabitants of this settlement give away raw material to neighboring settlements which are located more distant to the source of raw material. The inhabitants of this settlement again give away parts of the raw material received – in this case to settlements located even further away from the source. The whole exchange system is based on these small spatial steps which on a larger scale can be described as an exponential decrease in raw material. On a regional or even local scale, this pattern is more complex, however, since the rivers act as lines of communication and boundaries, i.e. accelerating or decelerating the distribution process.

These results can be further differentiated. As the analysis of the production of blanks shows, an average of 47% blades is characterized by modifications (Scharl 2010: 105). Compared to assemblages from other areas, like the Rhineland in Western Germany this value is quite high. Furthermore, the blanks are small-sized compared to assemblages from neighbouring regions (e.g. Strien 2000: 139, table 4.25).

Therefore, the raw material supply of the LBK settlements can be characterized as rather poor compared to neighbouring regions.

Surprisingly and in spite of this situation no locally available raw material was used. Besides, still differences in supply are visible between the LBK settlements in northwestern Bavaria. This is clearly visible considering the production of blanks for each site according to types of raw material used.

Figure 5 shows the proportion of blades and preparation debris made from Jura chert. It becomes clear that most assemblages are dominated by blades. Some sites, however, are characterized by higher proportions of flakes, respectively production debris and even cores. These settlements were obviously better supplied with Jura chert. They received cores and produced blades locally. A closer look reveals that these better supplied settlements are characterized by an enormous settlement area, which was used over a remarkably long time. Moreover they are characterized by a rich find material among which imports of pottery and lithic material are more frequent than on the other sites (e.g. Stadtlauringen (10), Rimpar (7), Rieden (6), Steinsfeld (11); Scharl 2010: 253–255). Because of these criteria these sites can be identified as so-called central places (see Saile 1998). As a consequence, the raw material procurement during late LBK is not only characterised by down-the-line exchange of non-local raw material types which is determined by the distance to a raw material's source but also by settlement hierarchy.

THE LITHIC PROCUREMENT STRATEGIES DURING POST-LBK

Compared to this, the raw material procurement during Post-LBK looks quite different (*Figure 3*). At first glance the lithic raw material procurement undergoes a dramatic change. All Post-LBK-assemblages are dominated by a single type of raw material – tabular chert from Arnhofen. The famous flint mine of Arnhofen is located in Lower Bavaria in a distance of ca. 150 km southeast of the area under investigation.

The high percentages of this type of raw material are obviously independent of the distance between site and source of raw material. The sites located more distant from the Arnhofen source show even higher proportions of this type of raw material than the assemblages, which lie close to the flint mine of Arnhofen.

This picture raises the question whether the Post-LBK lithic assemblages reflect collapsing procurement systems caused by a crisis or even depopulation at the end of LBK?

However, a closer look on several Post-LBK-assemblages reveals continuous developments as well: amongst others, hardly any local raw material was used in Post-LBK as well as in LBK settlements. Moreover, the same types of raw material are used in both periods. They even show similar ratios. Even the Arnhofen chert was already used during late LBK. Its proportion was quite low, however, and its spatial distribution is characterized by a gradual decrease in a northward direction. Therefore, only sites in the southern part of northwestern Bavaria show small proportions of this type of chert.

Further continuities are indicated by the production of blanks during Post-LBK (*Figure 4*). It exhibits similar patterns as in LBK. All assemblages are characterized by a high proportion of blades and a low proportion of production debris, like flakes, chips and flakes with cortex (for details see Scharl 2010: 107, Fig. 41).

This raises the question whether the raw material procurement during Post-LBK was also determined by down-the-line-exchange of finished tools and whether differences in supply are connected to a settlement hierarchy in terms of a better supply of central places?

This question cannot be answered in a simple way. Since the Arnhofen chert is a tabular chert which facilitates a different reduction technique – blades can be produced without elaborate preparation of the core – there is no production debris like flakes or flakes with cortex which would indicate local production. Therefore, all types of raw material used during Post-LBK have to be analysed separately especially the tabular chert from Arnhofen (for details see Scharl 2010: 117–131). In order to find out whether cores of Arnhofen chert were worked in NW Bavaria – which would indicate a good supply – we have to look for reduction accidents like hinges or the cores themselves. The number of these pieces, however, is quite low (Scharl 2010: 183, Fig. 108, 187, Fig. 111). This indicates that the Post-LBK settlements were obviously as bad supplied as the LBK settlements. Moreover most assemblages are characterised by this low proportion which means that there is no decline with increasing distance from the source of raw material (Scharl 2010: 183, Fig. 108, 187, Fig. 111). I.e. the

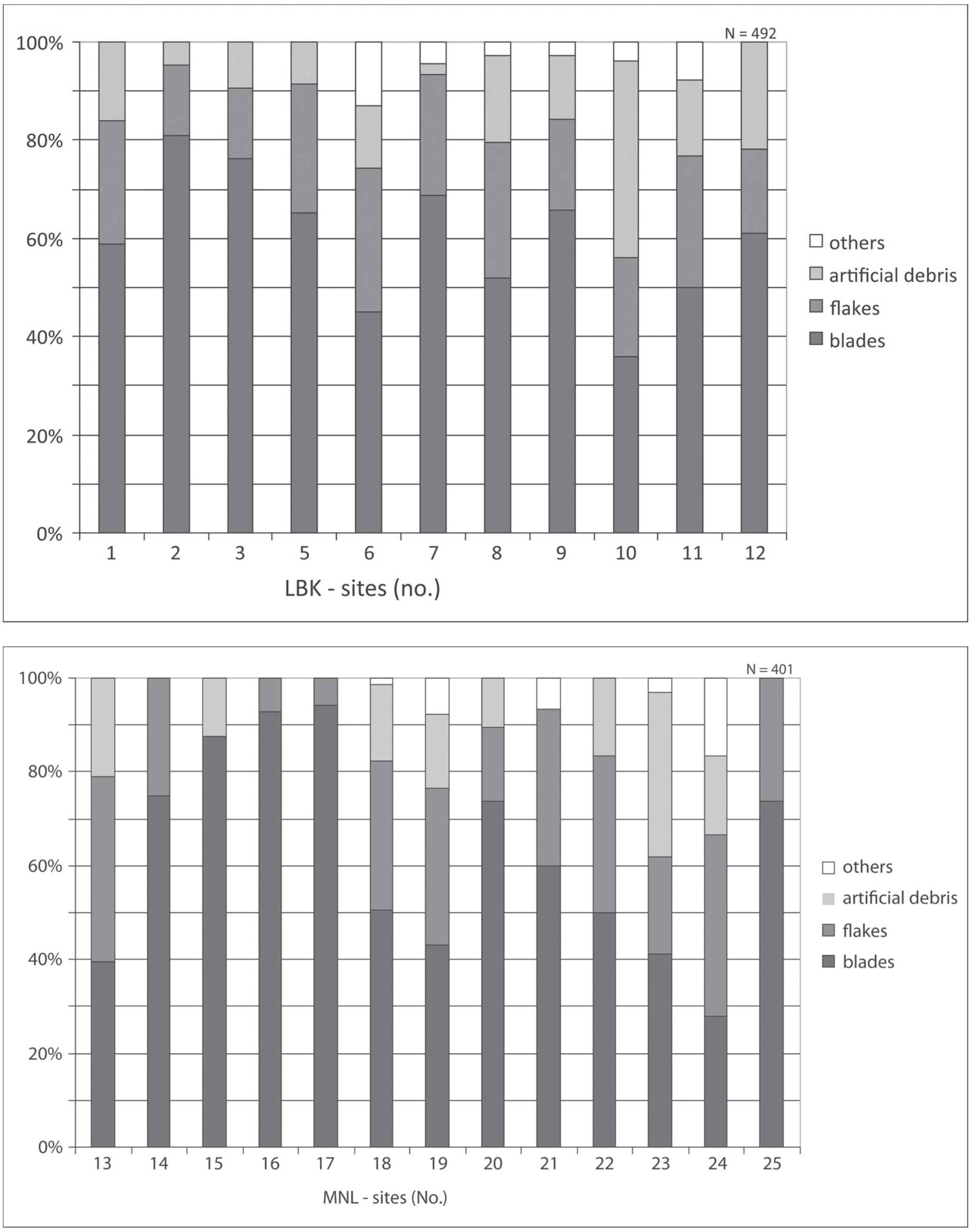

FIGURE 5. Proportion of blades and preparation debris made from Jura chert on LBK (above) and Post-LBK (below) sites.

spatial distribution of Arnhofen chert in Post-LBK-assemblages in NW-Bavaria is not influenced by the distance between site and source of raw material respectively flint mine.

These results support the assumption that Arnhofen chert was distributed in a different way than the other types of raw material used during Post-LBK. The latter show the same patterns as in LBK-assemblages: with increasing distance from the source of a certain raw material its relative and absolute amount decreases, the amount of blades made from it increases while the amount of cores, of production debris, as e.g. pieces with cortex, and the size of blades decreases (for details see Scharl 2010: 304–307).

As for the LBK assemblages, this indicates a raw material procurement system based on down-the-line-exchange (Renfrew 1972, 465–471). And again the rivers can be identified as lines of communication as well as boundaries, as e.g. the river Main for the Baltic flint (see *Figure 3*; for details see Scharl 2010: 299–301). Moreover, the ratio of modified blades is as high as during former times (*Figure 4;* see Scharl 2010: 105).

From these results, we can infer two different procurement strategies during Post-LBK, depending on the type of raw material used: direct supply with Arnhofen chert and down-the-line-exchange for all other types of raw material (Scharl 2010: 103–191, 278–303).

Interestingly the amount of modified blades remains high (49% modified blades), i.e. the supply does not improve despite the intensive use of Arnhofen chert (Scharl 2010: 105).

CONCLUSION

To sum up, as far as the raw material procurement is concerned, the developments during LBK-Post-LBK transition are characterised by continuities as well as discontinuities(for details see Scharl 2010). The latter are connected to the use of Arnhofen tabular chert while the use of other types of raw material is not affected at all (Scharl 2010: 304–307). But how can this direct supply with Arnhofen chert be explained?

This question cannot be treated in isolation. It is rather tied to the changes during the LBK-Post-LBK transition. These changes can be perceived on different levels. As far as the settlement system is concerned different developments become visible. On the one hand expansions take place based on the foundation of new settlements (Schier 2006: 64). On the other hand settlements are dislocated within near range (Eisenhauer 2002: 112, Scharl 2010: 285, Schier 2006: 64). Some central places of the LBK period continue while others disappear (Scharl 2010: 285). And finally, the number of settlements as a whole seems to decrease while the settlements themselves seem to enlarge – U. Eisenhauer calls them: "proper villages" (Eisenhauer 2002: 112–213).

So far we cannot verify the same settlement hierarchy as for the LBK period (central place – hamlet – single farmstead; see Classen 2005: 113–124), which can be connected to underlying communication networks and differences in raw material supply (Zimmermann 1995). More precisely, we cannot verify any settlement hierarchy at all, so far. If we assume the existence of less but at the same time larger settlements, which might have been more independent from each other, we have to expect that the communication network between these settlements or proper villages looked different from the one we assume for the LBK period. In order to avoid the risk of crop failure or to find mates these settlements might have been in close contact, however. Therefore, the communication networks between the Post-LBK-settlements might have been closer than during the previous LBK. This is indicated by the archaeological record on different levels. Another level or sphere that changed during LBK-Post-LBK transition was the production of pottery. As far as the pottery decoration is concerned we perceive that strict decoration rules and rapidly changing styles are followed over large distances. Since these decoration rules are quite complex specialists or particularly skilled persons might be assumed for its production (e.g. Eisenhauer 2002, Lindig 2002, Lönne 2003).

Moreover, a remarkable number of imports and imitations of SBK-pottery is known from Grossgartach-settlements and vice versa (e.g. Biermann 1997, Kaufmann 1996: 41). This – in my view – indicates close communication networks and high mobility between settlements or settlement areas.

These networks are also reflected in the construction of a rondel at Ippesheim. This site belongs to the Hinkelstein-Grossgartach-Roessen complex for which rondels are rather atypical. These monuments are mainly known from SBK and Lengyel sites in Lower Bavaria, the Czech Republic, Slovakia, Austria or Hungary. The rondel at Ippesheim does not only reflect foreign traditions. Its construction can be paralleled with several rondels in Lower Bavaria. All of them are characterized by an additional ditch surrounding the rondel itself and parts of the neighbouring settlement (Becker *et al.* 2012). Since this specific architectural detail could only be documented in Lower Bavaria and in Ippesheim direct contacts between both regions can be substantiated.

These closer communication networks might explain the increased amounts of Arnhofen chert in Post-LBK assemblages. Moreover, the maintenance of a common material culture seems to play an important role in Post-LBK cultural systems. This might explain the increased popularity of Arnhofen chert. Since this type of raw material is characterized by its unique characteristic banded appearance it has a high recognition value which was certainly noticed by prehistoric societies as well. Besides, Arnhofen chert is of high quality and because of its tabular form predestined for the production of long regular blades. Therefore, Arnhofen chert might have had an economic but also a symbolic meaning. It might have even accounted for the creation of identity, since the change of procurement strategy concerning the Arnhofen chert does not improve the supply with raw material in general. And other types of raw material are still traded by down-the-line-exchange. Therefore, the popularity of Arnhofen chert cannot only be explained by economic principles, rather social factors have to be taken into account as well.

REFERENCES

BECKER C., SCHARL S., ZERL T. 2012: Ippesheim – Interdisziplinäre Untersuchungen in einer mittelneolithischen Siedlung mit Kreisgrabenanlage. *Prähistorische Zeitschrift* 87, 2: 236–260.

BIERMANN E., 1997: *Großgartach und Oberlauterbach. Interregionale Beziehungen im süddeutschen Mittelneolithikum.* Archäologische Berichte 8. Habel, Bonn 1997.

CLASSEN E., 2005:, Siedlungsstrukturen der Bandkeramik im Rheinland. In: J. Lüning, C. Frirdich, A. Zimmermann (Eds.): *Die Bandkeramik im 21. Jahrhundert. Symposium in der Abtei Brauweiler vom 16.9.-19.9.2002.* Pp. 113–124. Verlag Marie Leidorf, Rahden, Westfalen.

EISENHAUER U., 2002: *Untersuchungen zur Siedlungs- und Kulturgeschichte des Mittelneolithikums in der Wetterau.* Universitätsforschungen zur Prähistorischen Archäologie 89. Habelt, Bonn.

ELBORG R., VAN DEN KROFT P., 2001: *Import trotz Überfluss – Bayerischer Plattenhornstein in Sachsen.* Arbeits und Forschungsberichte zur sächsischen Bodendenkmalpflege 43. Pp. 285–288. Deutscher Verlag der Wissenschaften, Leipzig.

ENGELHARDT B., 1981: Das *Neolithikum in Mittelfranken. I. Alt und Mittelneolithikum.* Materialhefte zur bayerischen Vorgeschichte A 42. Lassleben, Kallmünz.

FLOSS H., 1994: *Rohmaterialversorgung im Paläolithikum des Mittelrheingebietes.* Monographien des RGZM 21. Habelt, Bonn.

GAFFREY J., 1994: Die Steininventare der bandkeramischen Siedlungsplätze Langweiler 16 und Laurenzberg 8. In: J. Lüning, P. Stehli (Eds.): *Die Bandkeramik im Merzbachtal auf der Aldenhovener Platte.* Rheinische Ausgrabungen 36. Pp. 395–531. Rheinland-Verlag, Koeln.

GAYCK S., 2000: *Urgeschichtlicher Silexbergbau in Europa. Eine kritische Analyse zum gegenwärtigen Forschungsstand.* Beiträge zur Ur- und Frühgeschichte Mitteleuropas 15. Beier & Beran, Weissbach.

KAUFMANN D., 1996: Zu Kontakten zwischen thüringischer Stichbandkeramik und dem bayerischen Mittelneolithikum. In: S. Ostritz, R. Einicke (Eds.): *Terra & Praehistoria. Festschrift für K.-D. Jäger.* Pp. 41–52. Beier & Beran, Wilkau-Hasslau.

LINDIG S., 2002: *Das Früh- und Mittelneolithikum im Neckarmündungsgebiet*. Universitätsforschungen zur prähistorischen Archäologie 85. Habelt, Bonn.

LINK T., 2014: *Die linien- und stichbandkeramische Siedlung von Dresden-Prohlis. Eine Fallstudie zum Kulturwandel in der Region der oberen Elbe um 5000 v. Chr.* Veröffentlichungen des Landesamtes für Archäologie Sachsen, Band 60. Landesamt für Archäologie, Dresden.

LÖNNE P., 2003: *Das Mittelneolithikum im südlichen Niedersachsen. Untersuchungen zum Kulturenkomplex Großgartach – Planig-Friedberg – Rössen und zur Stichbandkeramik.* Materialhefte zur Ur- und Frühgeschichte Niedersachsens: Reihe A, Monographien 31. Verlag Marie Leidorf, Rahden/Westfalen.

MATEICIUCOVA I., TRNKA G., 2005: Steine aus nah und fern. In: F. Daim, W. Neubauer (Eds.): *Zeitreise Heldenberg Geheimnisvolle Kreisgräben.* Katalog zur Niederösterreichischen Landesausstellung 2005 Heldenberg in Kleinwetzdorf. Pp. 164–166. Verlag Berger, Horn, Wien.

MEIER-ARENDT W., 1966: *Die bandkeramische Kultur im Untermaingebiet.* Verein von Altertumsfreunden im Regierungsbez. Darmstadt.

RICHTER J., 1997: *Geschichtlicher Atlas der Rheinlande*. Beiheft II/2.1 – II/2.2. Neolithikum. Unter Mitarbeit von E. Claßen. Mit Beiträgen von A. J. Kahlis, J. Meurers-Balke. Rheinland-Verlag, Köln.

RENFREW C., 1972: *The Emergence of Civilisation. The Cyclades and the Aegean in the third Millenium B.C.* Methuen & Co. Ltd., London.

RIEDHAMMER K., 2006: *Mittelneolithikum – Eine neue Zeit mit alten Wurzeln.* Archäologie in Bayern. Fenster zur Vergangenheit. Pp. 65–74. Pustet, Regensburg.

SAILE T., 1998: *Untersuchungen zur ur- und frühgeschichtlichen Besiedlung der nördlichen Wetterau.* Materialhefte zur Vor- und Frühgeschichte in Hessen 21. Landesamt fuer Denkmalpflege Hessen, Wiesbaden.

SCHARL S., 2010: *Versorgungsstrategien und Tauschnetzwerke im Alt- und Mittelneolithikum. Die Silexversorgung im westlichen Franken.* Berliner Archäologische Forschungen 7. Verlag Marie Leidorf, Rahden/Westfalen.

SCHARL S., 2012: *Silex-Austauschsysteme am Übergang vom Alt- zum Mittelneolithikum im westlichen Franken.* In: R. Gleser, V. Becker (Eds.): Mitteleuropa im 5. Jahrtausend vor Christus. Beiträge zur Internationalen Konferenz in Münster 2010. Neolithikum und ältere Metallzeiten. Studien und Materialien 1. Pp. 431–444. Lit-Verlag, Berlin.

SCHIER W., 2006: *Siedlungsdynamik am Übergang vom Alt- zum Mittelneolithikum.* Archäologie in Bayern. Fenster zur Vergangenheit. Pp. 64. Pustet, Regensburg.

STRIEN H.-C., 2000: *Untersuchungen zur Bandkeramik in Wuerttemberg.* Universitätsforschungen zur Prähistorischen Archäologie 69. Habelt, Bonn.

SUHRBIER S., 2012: Multikulti in Mainfranken – Der Beginn des Mittelneolithikums. In: R. Gleser, V. Becker (Eds.): *Mitteleuropa im 5. Jahrtausend vor Christus. Beiträge zur internationalen Konferenz in Münster 2010. Neolithikum und ältere Metallzeiten.* Studien und Materialien 1. Pp. 141–149. Lit Verlag, Berlin.

TILLMANN A., 1986: *Tillmann, Boksee 1A (Schleswig-Holstein). Ein mesolithischer Fundplatz an der Wende Boreal/ Atlantikum*. BAR international series 280. Archaeopress, Oxford.
ZIMMERMANN A., 1995: *Austauschsysteme von Silexartefakten in der Bandkeramik Mitteleuropas.* Universitätsforschungen zur Prähistorischen Archäologie 26. Habelt, Bonn.

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