

Production Sites on the Beach Ridge of Järavallen

Aspects on Tool Preforms, Action, Technology, Ritual and the Continuity of Place

Anders Högberg

Järavallen is the name of a beach ridge along the south and south-west coasts of Scania in the southern part of Sweden. Large amounts of flint-tool preforms, particularly for square-sectioned Neolithic axes, have been found on three sites along this beach ridge. The several thousand preforms represent tool types from the Early Neolithic to the Early Bronze Age. The three sites have not been given much attention in recent archaeological research. With a basis in a discussion of action, technology, ritual and the continuity of place, these three sites are analysed and interpreted as representing traditions involving repeated actions over a long period of time. The production and deposition of the preforms are seen as an investment for the future.

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INTRODUCTION

In recent years, several archaeological studies in Sweden have focused on the continuity of place and on phenomena that extend over long periods of time (e.g., Karsten 1994; Burström 1997; Rudebeck & Ödman 2000; Berggren in press; Rudebeck 2002). In these studies, the analysis of activities according to the traditional archaeological periods is replaced by an emphasis on traditions that have persisted over a much longer time. The focus has often been on the “conspatiality” (Burström 1999) rather than on the contemporaneity.

The archaeological understanding of general patterns is based on traces of individual actions. In the article “Agency and individuals in long-term processes”, Ian Hodder argues that this quality of archaeology ought to have stimulated theory-building about the role of individual actions in the large scale, but that this has not been the case. Hodder also argues that intentionality should not only be seen in relation to the creativity and choices of the individual, but also in relation to the accessibility, in other words what is available to allow action to take place (Hodder 2000:22-23). Historical and material conditions create possibilities and

establish limits. It is within the social life that the individual creativity has a chance to thrive. This creativity, the intentions of individuals, is part of the interaction between the individual and the community (Barrett 1989; 1994). In this we find the dynamics in the study of individual actions, events and the impression they give.

The purpose of this article is to investigate how similar actions, repeated over time on beach ridges along the Scanian coast, created places of special significance and character. The focus is on a particular category of artefacts, flint-tool preforms, that were deposited on the beach ridge of Järavallen during the period from the Early Neolithic to the Early Bronze Age. In the study, I have been inspired by ideas concerning “conspatiality” and accessibility, as well as ideas concerning the relationship between individual actions and the general context of these actions. The tool preforms represent thousands of individual actions, all of which were repeatedly carried out at specific locations during a very long time. These individual actions made an imprint on the sites, and the general impression of them offers a possibility to analyse the sites and their possible significance over time. My intention is to investigate how we may gain knowledge of the actions and to discuss how the sites where these actions took place may have been an integral part of people’s stories, everyday-life and cosmology.

The article contains two parts. First, the archaeological material from the beach ridges is presented. I have tried to keep this part as short as possible, but as neither the beach ridges nor the artefacts from them have been significantly treated elsewhere, the presentation is extensive enough to allow this. The second part contains a discussion of the significance of the sites and of the actions that took place there. In this part, the focus is on action, technology, place, the continuity of place and ritual.

THE BEACH RIDGE OF JÄRAVALLEN AND THE PRODUCTION SITES

Järavallen is the name of a beach ridge along the south and south-west coasts of Scania in southern Sweden. It is situated approximately 5 meters above sea level and was formed by the post-glacial transgressions and regressions of the Litorina sea. The ridge consists mainly of stone, gravel and sand, and at some locations small flint nodules are prominent. The ridge has been used in various



Figure 1. Map of Scania with the sites Sibbarp, Barsebäck and Östra Torp indicated.

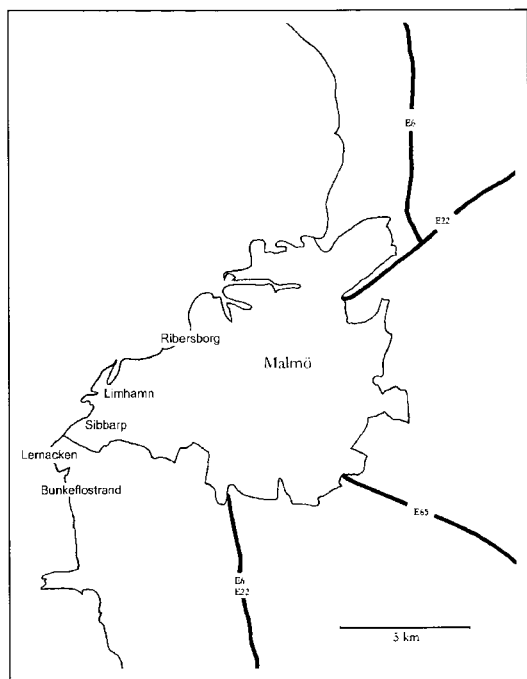


Figure 2. Map of Malmö with places names mentioned in the text.

arp, Barsebäck and Östra Torp. On the same sites there were also found large amounts of flint tool preforms (Högberg in press). These sites are briefly described below (fig. 1).

Sibbarp

The site of Sibbarp is now part of the city of Malmö and the beach ridge stretches along the southern part of the city's coast-line, from Ribersborg and Limhamn to the north, to Lernacken and the abutment of the bridge connecting Denmark and Sweden to the south (fig. 2).

Large areas of this part of the beach ridge are today either destroyed or built upon. The material in the ridge varies, but sand, gravel and rubble are the main components. At Lernacken and the abutment of the Öresund bridge there are large amounts of small flint nodules and at Sibbarp large nodules of high-quality Danian flint occur. A lesser amount of the nodules are of Scandinavian Senonian flint (Högberg *et al.* in press; Högberg & Olausson in press).

The many finds of tool preforms from Sibbarp have been known since the late nineteenth and the early twentieth century (fig. 3). Knut Kjellmark was the first archaeologist to publish information on the finds and their specific context (Kjellmark 1903; 1905). He was a very active collector, and his work was carried out during a time when large parts of the ridge at Sibbarp were used for gravel

ways in the course of history. The dry and well-drained soil made it suitable for communication routes in the otherwise clayey and wet coastal plain. During the wars between Denmark and Sweden in the seventeenth and eighteenth centuries the ridge was used for fortifications, and during the nineteenth and the early twentieth century large areas disappeared due to gravel extraction. Today much of the ridge is destroyed, built upon or lying under roads. The ridge was often visited during prehistoric time, and from the Late Mesolithic (Ertebölle) and onwards it was a resource area used for hunting and gathering, settlement, burials and communication routes. At three different locations along the ridge, there are large, natural deposits of big high-quality flint nodules. These places are Sibbarp, Barsebäck and Östra Torp.

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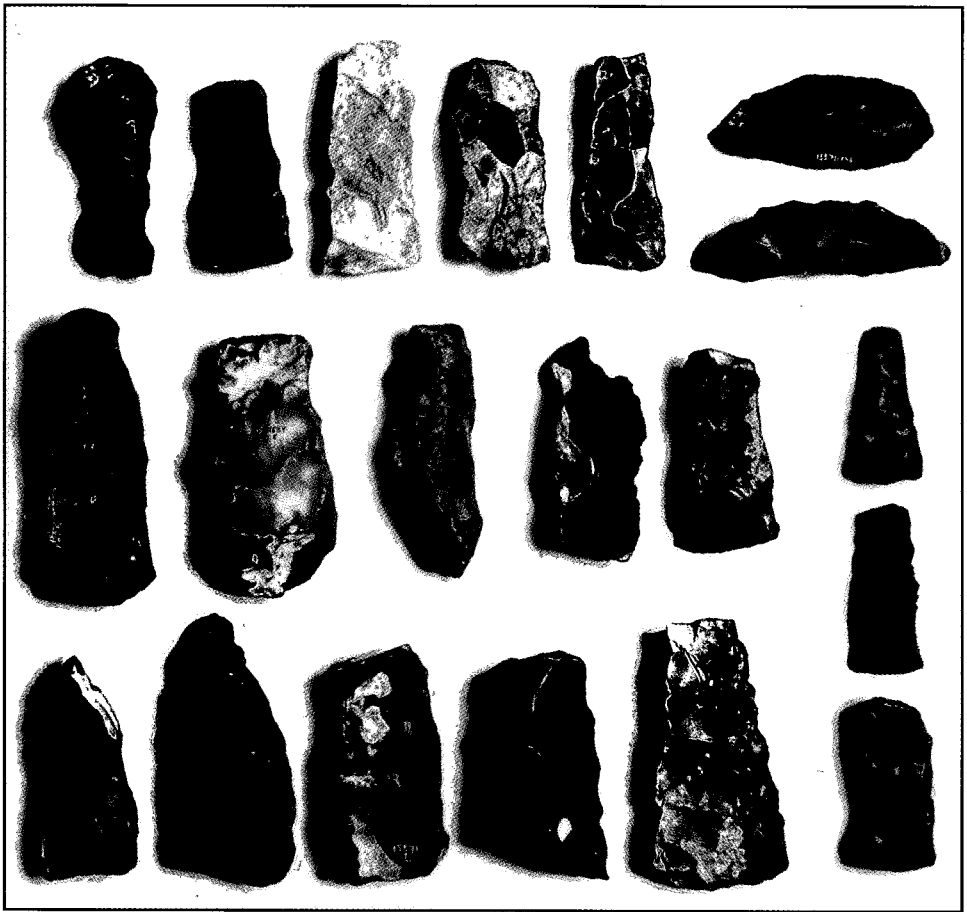


Figure 3. Flint-tool preforms from the beach ridge, mainly consisting of preforms for square-sectioned and point-butted axes, chisels and bifacials. Most of the preforms were found in the vicinity of Sibbarp. The majority are of various types of Danian flint, while a few are of Scandinavian Senonian flint. The preform to the lower left is c 15 cm long.

extraction. Hence, most of the preforms were found by gravel workers and documented and collected by Kjellmark during a few years of intensive exploitation of the ridge. In addition to Kjellmark, other scholars have presented and described various aspects of these finds, for example, Otto Rydbeck, Carl Axel Althin och Bengt Salomonsson (Rydbeck 1918; Althin 1954; Salomonsson 1971).

The number of preforms recovered at Sibbarp is difficult to estimate. Kjellmark states that the number is about 300, while Rydbeck only discusses seven preforms for point-butted axes (Rydbeck 1918). Althin bases the number presented in his thesis on Kjellmark's account (Althin 1954). Salomonsson estimates that the number of preforms from Sibbarp, preserved in various museum collections, is more than 500 (Salomonsson 1971). Kjellmark states that he, after examining

the artefacts and their find contexts, often allowed the finders to keep them (Kjellmark 1903). Therefore, it is clear that the number of preforms in the collections at the museums in Malmö and Lund is not representative of the number of preforms that were once found.

Salomonsson has discussed the dating of the preforms in more detail. He argues that the majority of them are preforms for hollow-edge thick-butted axes, and he ascribes them to the Pitted Ware Culture of the late Middle Neolithic. This dating has greatly influenced recent researchers, including myself (e.g., Högberg 2001a; Svensson *et al.* 2001) and the extensive production of axe preforms at Sibbarp has been associated with the late Middle Neolithic palisade enclosure at Bunkeflostrand (Svensson *et al.* 2001), which was recently partially investigated as part of the Öresund Link Project¹ (Jonsson 1995; Sarnäs & Nord Paulsson 2001). There is no room here to discuss Salomonsson's dating in detail. I have discussed the matter elsewhere (Högberg *in press*). During my examination of the preforms available in the local museum collections, I found that they consist of preforms for tool types which date from the Early Neolithic to the Early Bronze Age. Many of them can be more closely determined, for example, preforms for Early Neolithic point-butted axes, Middle Neolithic point-butted hollow-edge axes, Late Neolithic square-sectioned broad-edged axes and Late Neolithic/Early Bronze Age bifacials. There are, however, no signs of them being exclusively preforms for hollow-edge thick-butted axes. Hence, I consider Salomonsson's dating of the preforms only to the late Middle Neolithic to be mistaken (Högberg *in press*). The axe preforms from the Järavallen beach ridge at Sibbarp represent various time periods and should therefore be considered as accumulated during a long period of time.

In the coastal area on the inside of the beach ridge at Sibbarp, several archaeological excavations have been conducted, many of them as part of the Öresund Link Project (Billberg *et al.* 1996, 1998). These investigations have revealed production sites for square-sectioned flint axes, and large amounts of flakes from this type of production have been found (Högberg 1999; Sarnäs & Nord Paulsson 2001). The flakes are mostly of the same type of Danian flint as the tool preforms found at Sibbarp (Högberg 1999; Högberg *et al.* *in press*). Studies of axeproduction have shown that axe preforms usually were produced on sites for the raw material extraction and that the preforms hereafter were transported to settlements or to other production sites where the final shaping of the axes was done (Hansen & Madsen 1983; Knarrström 1997; Högberg 1999a). Therefore, it is reasonable to

¹ The Öresund Link Project is a large contract archaeological project, initiated as a consequence of the building of a new circular road around Malmö, connecting to the bridge across the Sound (Öresund). The Department of Antiquities in Malmö (since 2000, Malmö Heritage) conducted archaeological investigations along the course of this new traffic route between 1993 and 1998. The investigated areas are all located in a region which has been one of the most densely populated in Scandinavia since the Mesolithic. The results from the Öresund Link Project are currently being analysed, and the publishing of reports and syntheses started in the year 2000.

assume that much of the axe production conducted in the coastal area in the vicinity of the beach ridge, was based on preforms from Sibbarp.

Barsebäck

At the harbour in Barsebäck (Barsebäckshamn), Järavallen stretches to the north along the coast. Here the ridge is called Stenbocksvallar (the walls of Stenbock). This name derives from the defence walls and the redoubt which were built at the site during the early eighteenth century in connection with the Nordic wars (Streiffert & Prahl 1994). The beach ridge has been intensively used. During the later part of the nineteenth century, a brick-yard was built by the ridge and large-scale gravel extraction was initiated. During World War I fire trenches were dug into the ridge, and during the time of mobilization for World War II a number of concrete bunkers, the so-called Skånelinjen (or the Per-Albin linjen, named after the Prime Minister of Sweden at the time), were built along the ridge. What remains today is a hilly beach area, largely consisting of cuts in the ridge and of dumped soil. The flint within the ridge consists mainly of various types of Danian flint. Scandinavian Senonian flint is present to a lesser degree (fig. 4).

The many finds of tool preforms in the beach ridge at the harbour in Barsebäck have been known since the beginning of the twentieth century (fig. 5).

Also in this case, Knut Kjellmark was the first archaeologist to publish information on the finds from the beach ridge (Kjellmark 1905). He noticed the similarity of the finds and the contexts between Barsebäck and Sibbarp. Because Kjellmark's main interest at the time was the settlement sites of the Mesolithic Ertebölle Culture, he did not analyse the preforms from the beach ridge (Kjellmark 1905). Althin used Kjellmark's information from 1905 in his dissertation (Althin 1954). Apart from this, there is to my knowledge no published information on the finds of tool preforms at Barsebäck.

Most of the preforms were discovered in connection with the extensive gravel extraction that was in operation during the end of the nineteenth and the beginning of the twentieth century. According to some information, more than 1000 preforms were supposedly found in the ridge on one single occasion in 1912

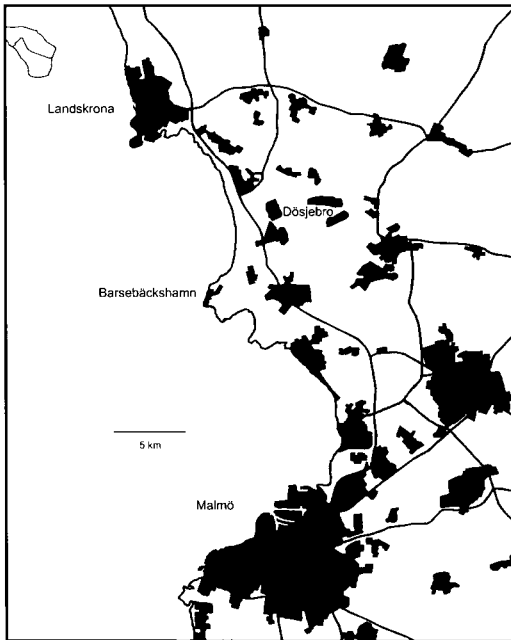


Figure 4. Map showing the harbour in Barsebäck and the site of Dösjebro.

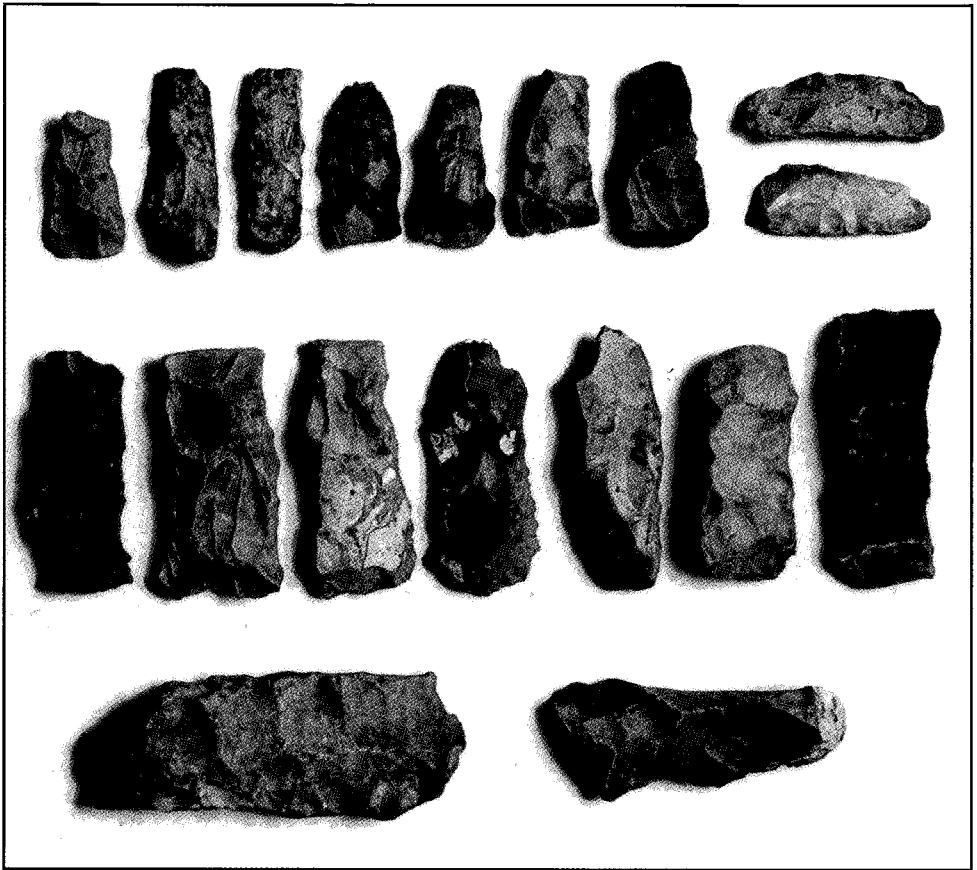


Figure 5. Tool preforms from Barsebäck. The preform to the lower left is c 25 cm long.

(Althin 1954). Today these finds are scattered, and many preforms are included in the collections of the local farms. The collection at the Lund University Historical Museum contains about 200 preforms from Barsebäck. It is clear that the number of preforms in the various collections is not representative of the number of preforms that were once found.

The dating of the preforms from Barsebäck has only been treated in general terms in the publications. During my analysis of the available preforms in the museum collections, it became clear that they are of various types, just as the preforms from Sibbarp. Among them are preforms for point-butted axes, thin-butted axes, thick-butted axes and bifacials (Högberg in press).

As I have not studied artefacts from archaeological excavations in the vicinity of Barsebäck, it is unclear whether the preforms were made into finished axes in the local area, as was the case in Sibbarp. However, in the village of Dösjebro, about 10 kilometers from the coast, large-scale excavations were conducted recently by the Swedish National Heritage Board in Lund (RAÄ UV-syd) as part

of the West Coast Line project and several production sites for square-sectioned axes were investigated (fig. 4). A palisade enclosure from the Middle Neolithic was also investigated at the site. In one of the reports from the excavations, it is argued that the nearest raw material source for the flint used in the axe production at the site is the beach ridge of Järavallen on the coast (Svensson *et al.* 2001). However, the tool preforms found at Barsebäck are not mentioned in this context. It seems reasonable to associate the preforms from Barsebäck with the axe production sites at Dösjebro.

Östra Torp

At Östra Torp, about five kilometers east of the city of Trelleborg, at the southernmost point of Sweden (Smygehuk), the beach ridge of Järavallen runs slightly more pronounced along the coast (fig. 6). The coastal road between the cities of Trelleborg and Ystad runs along the peak of the ridge. Extensive limestone quarrying in the area has changed the topography of the ridge, and as at Barsebäck, various defence facilities have also been built. The flint in the ridge consists exclusively of Matte Danian flint of Östra Torp type (Högberg & Olausson in press).

In the beginning of the twentieth century, the vicar at the church in Östra Torp collected surface finds in the area and brought the site to the attention of the archaeologist Folke Hansen. In a note in the journal *Fornvännen* of 1929, Hansen was the first to publish information on the finds (Hansen 1929). In his dissertation, Althin analysed the preforms found at the site. About seventy preforms from Östra Torp are present in the collection at the Museum of National Antiquities (Statens Historiska Museum) in Stockholm and about ten are present in the collection at the Lund University Historical Museum (Althin 1954). Jan Apel argues in his recently published dissertation that the site may have been a production site for dagger preforms during the Late Neolithic (Apel 2001).

The dating of the preforms from Östra Torp is uncertain. Hansen places them in the Neolithic and Althin refers to this information in his dissertation (Hansen 1929; Althin 1954). I have not had the opportunity to study the preforms, and can only rely on photos and descriptions in Hansen's article and in the catalogue of annual information (*Tillväxten*) from 1929, published by the Museum of National Antiquities. The photos and the written information reveal that the

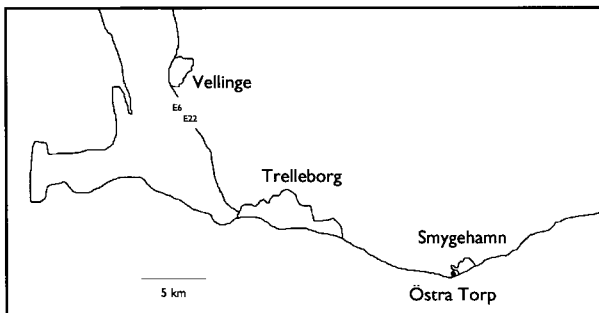


Figure 6. The site of Östra Torp.

preforms probably represent tool types from a time period between the Early Neolithic and the Late Neolithic/Early Bronze Age (Högberg in press). As I have not had the opportunity to study artefacts from excavations in the coastal districts of this region, I do not know whether the preforms from Östra Torp were made into finished axes in the vicinity.

Other similar places in southern Scandinavia

In addition to the above-mentioned places, there is another Scanian site of particular interest in this context. However, in this case the preforms and axes are made of ground stone. Close to the lighthouse at Kullen in the north-west part of Scania, about 200 ground stone preforms and axes were found close to the beach ridge (Kjellmark 1905; Althin 1954).

“The most significant feature of the settlement is the large amount of rough greenstone axes; most of them are merely roughly knapped and seem to be preforms intended for polishing, others are only imperfectly polished, often only at the edge” (Kjellmark 1905, ER translation).

Although the focus here obviously was on the production of preforms for ground stone axes, not flint axes, it is possible that the site is of a similar type as those three on the beach ridge of Järavallen in southern Scania.

In Denmark about twenty sites with large amounts of preforms are known (Ebbesen 1980; Kempfner-Jørgensen & Liversage 1985). Common to all these sites is that they are located in places rich in natural deposits of high-quality flint. Just as the sites in Scania, many of them are located on beach ridges.

THE PREFORMS FROM SIBBARP, BARSEBÄCK AND ÖSTRA TORP – DISCUSSION AND CONCLUSION

At three sites along the west and south-west coasts of Scania there is evidence of an extensive production of flint tool preforms. At these sites, high-quality Danian flint was available in the beach ridge of Järavallen and, as far as I know, these are the only sites along the coast where this amount of high-quality flint could be found. Large amounts of tool preforms have been left at these sites. It is clear that they represent many separate actions, performed during different times. The preforms represent various types of tools that can be dated to periods between the Early Neolithic and the Early Bronze Age, and it is clear that they were produced in accordance with different technological approaches (fig. 7) (Högberg in press).

Since the sites have been heavily affected by modern activities it is impossible to determine whether the flint nodules for the preforms have been dug from the beach ridges, as for example was the case at similar raw material extraction sites at beach ridges in Scotland (Saville 2000), or if eroded flint nodules from the beach ridges have been picked up from the beaches (Knarrström 2001).

On several occasions, the preforms left on the beach ridges have been interpreted as discarded and non-functional (e.g., Glob 1951; Salomonsson 1979). The basis for this interpretation is the idea that, if the preforms had been suitable

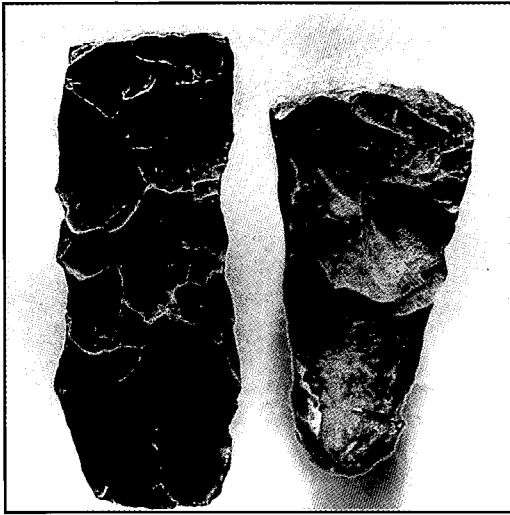


Figure 7. A straight axe preform and a preform with broad edge. Note the difference in size of the flake scars between the preforms, which indicates different technological approaches. The preform to the left is c 22 cm long.

for tool production, they would not have been left at the sites: "... one has to remember that it is only the discarded preforms that have been left. The adequate preforms were taken away" (Salomonsson 1971:81, ER translation).

A closer study of the axe preforms in the museum collections in Malmö and Lund reveals, however, that most of them are of such quality that they could have been made, without any technological problems, into finished axes. Hence, the preforms were not left behind because they were rejected out of technological consideration or because they were not suitable for further tool production.

This aspect of quality of the preforms, the fact that most of them are fully functional and suitable for tool production, has not previously been part of the discussion of these finds. Therefore I find it necessary to incorporate these premises in the discussion.

PREVIOUS INTERPRETATIONS OF THE PREFORMS FROM THE BEACH RIDGES

Several Scandinavian beach ridge sites with an abundance of tool preforms have been described in various contexts (see Ebbesen 1980 for an overview). However, most of the descriptions are highly generalised and focus on the fact that large amounts of preforms in modern time have been *discovered* at these sites. The possible reasons behind the *deposition* of the preforms at these particular sites have rarely been touched upon. The artefacts have generally been regarded as a group of finds rather than as evidence of several separate depositions on these particular sites. This is only to be expected, since the artefacts have been *found* in large amounts on one or a few occasions. As previously mentioned, most of the preforms from Sibbarp were found during a few years of intensive gravel extraction, and at Barsebäck about 1000 preforms were discovered on one particular occasion in connection with gravel extraction. However, this does not mean that the preforms were actually *deposited* on only one or a few occasions. The published descriptions of the finds reveal that the circumstances of their discovery have influenced the interpretations, and contributed to them being conceived of as several artefacts deposited on one or a few occasions (Kjellmark 1903, 1905; Rydbeck 1918;

Salomonsson 1971). The renewed analysis of the material reveals, however, that it is important to have in mind that each preform, which is a part of the large finds, represents separate actions and that these actions have taken place repeatedly over a very long time period (Högberg in press).

Generally, two different interpretations have been suggested for the finds; they have either been interpreted as representing production sites and goods in stock, or as ritual deposits. According to the former interpretation, the tool preforms are regarded as produced in large amounts during a short period of time (e.g., Glob 1951; Salomonsson 1971). The site of Sibbarp has in these contexts been labelled an “axe factory” (Salomonsson 1971). The latter interpretation may be seen as an argument against this functional view, and here (based i.a. on the “axe sites” on the west coast of Sweden, where large amounts of pointed tools and axes (of Lihult type) have been discovered) it is the ritual significance of the sites and the deposition of preforms that have been in focus (Ebbesen 1980:299; Carlsson 1998:29).

I find both of the above-mentioned interpretations unsatisfactory in that they are both associated with short-term events and with a uniform purpose concerning the production, handling and deposition of the preforms. Hence, both the term “axe factory” and the term “ritual deposit” are inadequate. The problem with these interpretations is that the preforms have been regarded as a homogeneous group of artefacts, and that the great variety within this group has not been investigated in detail. The very long time-span that the preforms represent, and the variation in the technological tradition among them, reveal that the above interpretations are inadequate. The axe preforms represent activities from different time periods. They have therefore not been left at the various sites on only one or a few occasions and they have not been left in heaps. However, as will be obvious in the following discussion, both interpretations are in fact reasonable if modified in various ways (for a similar view, see Ebbesen 1980).

THE SIGNIFICANCE OF THE SITES

What, then, was the significance of these sites? What aspects of human activities do the preforms represent? What parts of human actions are present in the find material? It is clear that the beach ridges were production sites for large amounts of tool preforms, particularly axe preforms. The production was extensive, and preforms were transported to other places in the vicinity for further knapping. (It is not unreasonable to assume that the preforms were also transported further away, although this hypothesis will not be discussed here.) Why, then, were so many preforms left at the beach ridges? Fully functional preforms were produced but left behind without being made into finished axes. In order to discuss the possible reasons for this, I have chosen to take as a point of departure the actual process of production. Although the production may be only one of several possible reasons for the repeated use of the sites, it is an activity that connects the use of the sites over time. Hence, the production may be seen as the “perpetual

variable". The significance of the production and of its organization, and the way that its various purposes and aims came to material expression, probably varied over time. However, the activity that was constant at the beach ridges in the long term was the production of axe preforms. People have been knapping preforms of flint. This activity took place at, as previously mentioned, three different locations in south-west Scania: Sibbarp, Barsebäck and Östra Torp.

ACTION, PRODUCTION AND TECHNOLOGY

Because the point of departure in this study is production, and because production implies technology, it is important to briefly discuss the basis for the study of flint technology which is applied here. Technology is created and used by people and is therefore something which joins human thought with material action (Schlanger 1994:143). Technology, that is the physical creation of things, is a social phenomenon. The intellectual thought is in its action a formulating such. The performing action is a practical thought. In the practical action, the intellectual thought is manifested (Schlanger 1994:143). The socially constituted thoughts which have shaped technology are manifested, in action, through the technology. This line of argument is here only used to stress the social implications of technology. The established differences between theoretical thoughts and practical actions (Bourdieu 1977; Broady 1989) or between knowledge and know-how (Pelegrin 1990; Apel 2001) are important to note, but will not be further discussed here.

A characteristic of flint knapping is that several possibilities exist concerning the choice of available techniques and methods for the production of specific objects. Among the different strategies suitable for flint knapping, there is the possibility to choose the most suitable for the purpose: "Whilst the production of stone tools takes place within broad physical and mechanical constraints imposed by the raw material, the artisan is nevertheless capable of implementing a number of different strategies to create a particular artefact" (Edmonds 1990:57).

The actual choice of raw material and flint knapping strategies, however, is not based solely on the evaluation of technological and methodological suitability. Within the cultural framework where the flint knapper works, functional and traditional requirements create a need for specific objects. This need controls the choice of strategies concerning the raw material, techniques and methods used to make the object (Pelegrin 1990). As the flint knapper has the possibilities, within the framework of the tradition which he or she works, to choose a strategy for the task, the flint knapper's, and through the flint knapper the community's, attitude to flint as a raw material is manifested in the results of the flint knapper's work, that is to say, in the product and the waste material from the production. Each product is thereby a result of a chain of cultural choices in relation to function, technology and requirements. Each product and the handling of each product is an indication of a conception of the flint as raw material, and therefore the product gives a clue to the understanding of the many decisions that created its shape and use (Högberg 2001b).

Actions are essential in technology. Through the study of actions it is possible to approach the culturally conditioned choices which have created the prerequisites for the production of various objects. Therefore it is important to briefly discuss the premises that are used in this context in order to study technology and action.

Chaîne opératoire – chain of action

Technological studies of complex forms of production in which action has been the object, for example the production of square-sectioned flint axes (Högberg 1999), flint daggers (Apel 2001) or pottery (van der Leeuw 1994), have shown that specialised production is based on strategies that include several stages of production. These stages are all performed within the frames of what is available to allow action to take place. By studying actions it is possible to gain knowledge of the conditions for these actions. A well-established way to study action, technology, tool production and the handling of tools is by means of *chaîne opératoire*, (chains of actions) (fig. 8) (Inizan *et al.* 1992; van der Leeuw 1994; Eriksen 2000).

Chaîne opératoire can be translated as “chain of action” and can generally be described as a method for analysing action, production and handling of tools from the point of view of technology and cognition - from the choice of raw material to the discarded or deposited object. The method is well-established within studies of lithic technology (Edmonds 1990; Inizan *et al.* 1992; Eriksen 2000; Apel 2001). *Chaîne opératoire* may be seen as a construction, a schematic description of an ideal course of action, which provides the archaeological interpretation with a methodological tool in the study of technology and the life-cycle of tools (Eriksen 2000).

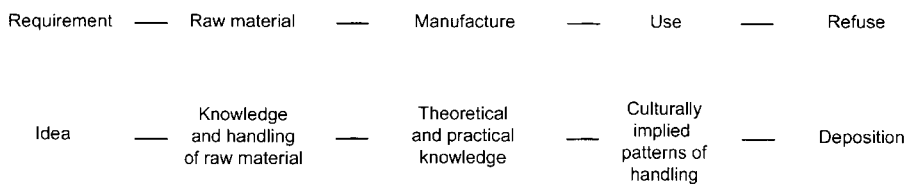


Figure 8. Chains of actions. By using different terms for the same chain of action, various aspects are illuminated. The pair of conceptions requirement and idea can contain aspects of assets and demands, purpose and meaning with the production, allowed and prohibited as well as practical and ideological demands. The pair of conceptions raw material and knowledge and handling of raw material can contain aspects of trade and exchange, raw material availability, choices of raw material based on functional or ideological reasons as well as control over and the distribution of assets. Manufacture or theoretical and practical knowledge are a pair of conceptions which can include thoughts about technological and methodological aspects of production, different levels of knowledge and specialisation, different patterns of learning and apprenticeship as well as discussions about control of the craft and the craftsmen. Use of the product or culturally implied patterns of handling can contain aspects of the ideological and symbolic meaning of the object in different contexts, the everyday use of things, reuse and repairs, functional and symbolic efficiency as well as ritual meaning. The pair of conceptions deposition and refuse can contain aspects of the life span of the object, long or short time of use, waste deposition and patterns of deposition as well as the deposition's functional, symbolical and ritual meaning.

Axe preforms and chains of action

Technology and action are intimately connected to the result of actions, that is the material culture. It is through the objects that the possibility to investigate actions is at hand. Therefore, it is important to briefly return to the preforms from the beach ridges in order to investigate how a chain of action for these objects may be analysed. First, however, we must take a look at the premises for a general *chains of actions* for production. Because most of the preforms from the beach ridges are axe preforms, I will from now on use axes as an example. The various stages of axe production have been thoroughly discussed in several studies (Arnold 1981a, 1981b; Hansen & Madsen 1983; Olausson 1983a, 1983b; Madsen 1984; Nordquist 1988, 1991; Knarrström 1997; Högberg 1998, 1999). It is common to understand this production as divided into five different stages, with the accomplishment of each stage being dependent upon the results of that preceding it (fig. 9).

Stages one and two are generally regarded as having been carried out at the raw material source, place A in fig. 9 (Hansen & Madsen 1983; Knarrström 1997; Högberg 1999), and stages three and four as carried out either at large production sites or at settlement sites, place B in fig. 9 (Hansen & Madsen 1983; Knarrström 1997; Högberg 1999). Stage five, the final polishing of the axe, is generally considered to have taken place at yet another location, place C in fig. 9 (Hansen & Madsen 1983).

This means that the axe production can be divided into five production stages and into three locality stages, depending on the place where the different production stages were carried out (fig. 9). If we place the preforms from the beach ridges in this *chains of actions*, they represent stage one and two in the production chain, and, expressed in spatial terms, as belonging to place A. It is important to note in this context that the preforms were part of a chain of action until they were removed

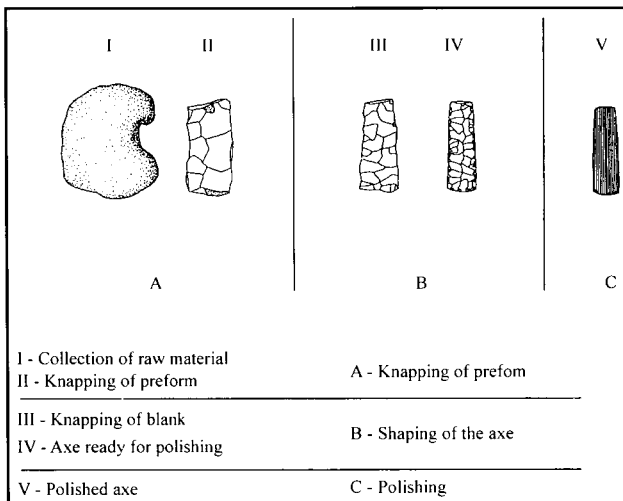


Figure 9. Chains of actions for axe production, with five stages and three locations related to each stage. Square-sectioned axes are produced with what is known as the quadri-facial method. The basis of this method is a four-sided surface covering flaking that results in a blank with squared or rectangular cross-section. The production of square-sectioned axes can be divided into various working stages, with the accomplishment of each stage being dependent upon the result of that preceding it, from stage one when suitable raw material is obtained, to stage five and the final polishing of the axe.

from it. In other words, it would have been possible to make these preforms into finished axes. In other contexts, finds of so-called symbolic axe preforms, or axe images, have been made (e.g., Björhem & Säfvestad 1989). These objects are naturally shaped or only slightly knapped flints that have the same shape as actual axe preforms, but they could never have been shaped into finished axes due to poor quality or irregularities in the chosen flint nodules. The axe preforms from the beach ridges are not of this type, but instead fully functional preforms.

A CHAIN OF ACTION FOR THE PREFORMS FROM THE BEACH RIDGES

In accordance with the *chains of actions* presented above, it is clear that the axe preforms from the beach ridges had a life-cycle from stage two in the production chain directly to deposition. The hypothetical normal life-cycle of an axe, from production to various forms of use and, finally, to discarding and deposition, has been passed over and the preforms were deposited before even becoming finished tools. Yet the finds from production sites inside the beach ridges reveal that other preforms from the beach ridges were kept within the production chain and made into finished axes. As a consequence of this discussion, the question arises of how a *chain of actions* for axe production concerning axe preforms from the beach ridges may have been organised. Perhaps the preforms left behind were part of the chain of actions, in which the production of axes based on preforms from the beach ridge actually contained the production of more preforms than axes, and consequently resulted in a larger production of preforms than axes? A *chain of actions* for the production should perhaps not be seen as a linear process – from *one* preform to *one* axe. Considering the amount of preforms produced and left behind, a *chain of actions* for the production of axes from the beach ridge preforms, should possibly be seen as consisting of an initial production of *one, two or more* axe preforms, resulting in the production of *one* polished axe (fig. 10).

In conclusion, it may be established that the axe preforms from the beach ridges could well have become finished axes. The production of axes included the production of preforms intended for further transport and the production of preforms intended to be deposited on the ridges. Concerning the latter, the hypothetical normal life-cycle of axe preforms was skipped and the preforms were deposited without having been made into axes.

THE BEACH RIDGES IN A NEW LIGHT

Previous interpretations of the beach ridges included a dualism between the terms “axe factories” and “ritual sites”. Here I will discuss the beach ridges and the finds of axe preforms with the intention of uniting these interpretations. Central concepts in this discussion are *chains of actions*, technology and action, where technology and action are seen as culturally constituted and as manifesting the thoughts that have shaped them.

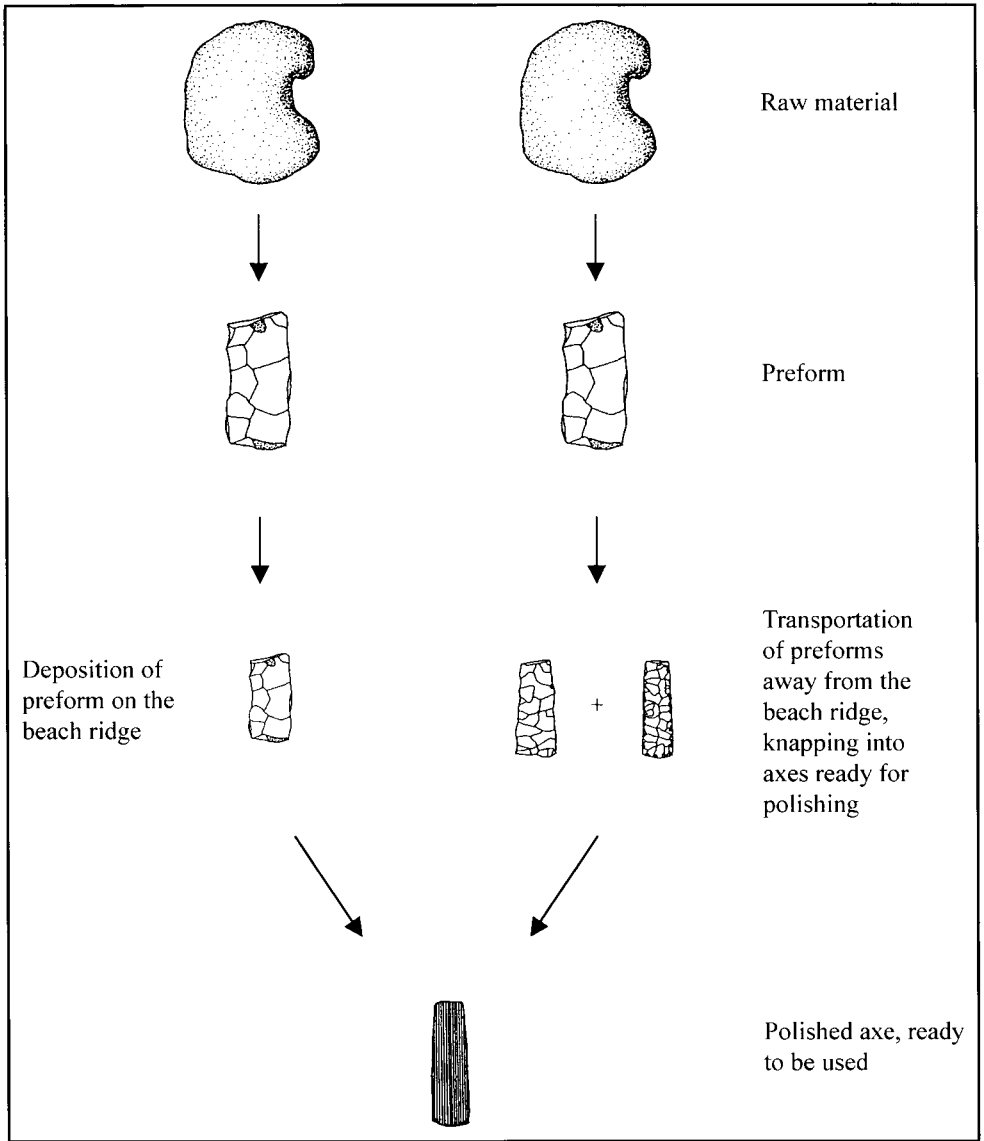


Figure 10. Suggested chain of actions for the production and life-cycle of the beach ridge preforms. A number of flint nodules are selected for the production of two or more preforms. One of the preforms is deposited on the beach ridge, while others are brought along to be made into finished axes at other locations. These actions, both the deposition of the preform on the beach ridge and the transportation of preforms to other locations, were part of the chain of production for axes.

Archaeological studies of prehistoric societies and of human action in the past inevitably bring up questions of rationality. There has been a long-standing tradition to assume either that humans in the past had the same conception of rationality as people today, or that they were mainly irrational (Damm 1998).

This has been the case both concerning studies of practical actions such as production and exchange – usually regarded as rational, and concerning abstract phenomena such as ritual and religion – usually regarded as irrational. In the present study, the ambition is to look beyond these dualistic terms and to view them as integrated parts of the prehistoric society, or rather as contrasts that never existed in prehistory as we see them today (e.g. Edmonds 1999). However, the concepts remain in this text, but only for the purpose of being used as analytical tools.

Production sites, stock of goods and axe factories

That people value access to high-quality raw materials and that various social groups make efforts to acquire such materials, is something that has been shown in several studies. The relationship between places with natural assets and the significance of these places as raw material sources has been stressed (Højlund 1979; Hansen & Madsen 1983; Edmonds 1995; Apel 2001). One main reason for using the beach ridges for the production of preforms is, of course, the natural conditions of these sites. The huge amount of high-quality raw material in the ridge was a prerequisite for the use of the place for this purpose. The production of preforms, both those which were transported elsewhere to be knapped into axes, and those which were left on the site, was extensive.

Because the preforms were produced during a long time, it is, as previously mentioned, not reasonable to interpret them as axe factories in the modern sense of the word; that is, as “industrial production with a centrally organised division of labour and mechanised production steps, connected by a common exertion and aiming at mass-production” (*Nationalencyklopedin* 1997-98, ER translation). The preforms have obviously been accumulated over a long period of time. But what was the reason for this? Within various techno-complexes, ideas of availability exist. Several anthropological examples have been described, where tools and raw materials have been stored for future use (Binford 1983). The tools and raw materials have not always been stored with the intention of being used by those who stored them. Lewis Binford describes this with the term “insurance gear”, and explains the term by using the words of a Nunamiut spokesman:

“Every time men go out for something they have space in the pack or on the sled on the way out. Good men always say *what can I carry that may help someone in the future*. Maybe they decide that where they are going there is no firewood, so maybe they take out some extra. Maybe there is no good stone for using with Strike-a-Light, so maybe they take out some extra to leave out there in case somebody needs it later. In the old days ... fellows always carried out shiny stones for making tools and left them all over the place so if you needed them they would be around.” (Binford 1983:271)

If this tradition of solidarity is transferred to the discussion of the preforms from the beach ridges, it would mean that an organised habit and tradition stated that

supplementary preforms should always be produced and left at the site for future use. If this was the case, the preforms were actually a stock of goods, although not in the modern sense of “stock for the keeping of semi-manufactured products and finished products intended for sale” (*Nationalencyklopedin* 1997-98, ER translation). However, the argument that these preforms were produced in order to be made into axes on a later occasion is problematic, considering the great number of preforms. This number reveals that the site, after many repeated visits, must have been virtually scattered with preforms. Hence, it is unlikely that the notion of availability was the reason for the production of preforms for later use. There were already enough preforms to easily pick up directly from the beach. The tradition of leaving all of these preforms on the beach ridge probably had another reason than to secure the future availability of preforms.

Ritual deposits

Water and various natural formations are often closely connected with rituals and have been considered important symbols in conceptions of the relation between the human being and the surrounding world (Karsten 1994; Koch 1998; Edmonds 1999; Bradley 2000; Rudebeck & Ödman 2000). Water and natural formations may be seen as representing aspects of human cosmologies (Rudebeck & Ödman 2000). The beach ridge is a place which connects these attributes, a manifest natural formation located directly near water. The tradition of depositing objects in or in the vicinity of wetland areas during the Neolithic has been thoroughly studied. The objects thus deposited are usually interpreted in terms of ritual offerings (Svensson 1993; Karsten 1994; Hallgren *et al.* 1997; Koch 1998). The axe was obviously one of the typical types of objects in these depositions (Karsten 1994). It is clear that also raw material extraction and the production of axes may be interpreted in ritual terms (Edmonds 1995; Rudebeck 1998). As an example, one can mention Gabriel Cooney’s study of social and ritual aspects of axe production and axe production sites in Ireland and Great Britain (Cooney 1998). Cooney describes axe production as an activity connected to ritual and the sites where this was carried out as permeated with ritual and symbolic aspects (Cooney 1998:110).

Should we regard the remaining preforms at the beach ridges as the material expression of ritual? A general definition of ritual is “a standardised, institutionalised behaviour with symbolic significance, in which the ritual is symbolic in the sense that the conventional behaviour expresses a deeper-lying meaning of religious, magic or other kind” (*Nationalencyklopedin* 1997-98, ER translation). Hence, rituals are regulated and there is cultural agreement on the significance of the conventions. However, studies have shown that there may be room for significant variation, where agreement on individual parts of the ritual is not completely necessary (Damm 1998). In a study of the social and ritual aspects of raw material extraction, with regard to axe production and axe use in the highlands of New Guinea, Højlund has shown how the significance of axes within a society varies

in norm and practice (Højlund 1979). Axes are reserved for men. The male axes and the use of them is associated with a complex social and ritual set of rules concerning how, when and why the axes may be used. This is the norm. However, there are examples when women sometimes within the household started to use old axes to cut wood. Hence, the norm is challenged by practice. This practice is not normatively accepted and it is not very common, although it does occur. Although the norm expresses unity, the social and ritual significance of the axe in this society is ambiguous. Rituals may be regarded as open to interpretation, and it is not necessary to assume the presence of a general unanimity. Rituals may change from person to person, from context to context, and from one time to another. The unified impression of the ritual is nevertheless a perception of unanimity.

The ritual action differs in various ways and to various degrees from other actions. This can take place through the establishment of form and content, fixations, repetitions or routines. The ritual can be an ordinary action or event, which through the context has come to be perceived as a ritual. The context can consist of the overall impression of, for instance, the environment, the performed actions and the participants' reactions to them (Damm 1998). The important thing in this study is to focus on everyday actions, but also to regard the commonplace as possibly integral to ritualised behaviour.

Anthropological studies have shown that stones, animals, celestial bodies and various natural phenomena are often part of rituals. They are the paraphernalia of human cosmologies (e.g., Lévi-Strauss 1987). However, the structures of meaning and the internal relationship within this paraphernalia have proved to be abstruse and difficult to define:

“The accurate identification of every animal, plant, stone, heavenly body or natural phenomenon mentioned in myths and rituals is a complex task for which the ethnographer is rarely equipped. Even this is not however enough. It is also necessary to know the role which each culture gives them within its own system of significances. Of all these minute details, patiently accumulated over the centuries and faithfully transmitted from generation to generation, only a few are however actually employed for giving animals or plants (or stones) a significant function in the system.” (Lévi-Strauss 1962:53-54).

This reveals the complexity in studies of the meaning of various details in rituals, and may be apprehended as discouraging. However, what is of importance here is that the meaning of objects and details in ritual is actually stated. They are part of the ritual and they are important in the ritual, irrespective of whether the meaning is elusive or not. This fact has important consequences for the present study. The task is to study the objects, the preforms from the beach ridge sites, as possible paraphernalia of a cosmology, as manifestations of ritual. The specific significance of these preforms is not in focus, but instead the material expression of rituals. The shaping of the preforms, the deposition of them on the ridges and the transport

of selected preforms to other sites (for final knapping) may all be seen as integral parts of a normative behaviour with the symbolic signification of constituting the sites as essential in the collective memory of the community. In this context, the preforms were the material expression, the paraphernalia, of the ritual. The cosmological significance of the sites was manifested in the action of leaving behind part of the production.

THE BEACH RIDGE AND THE PREFORMS – AN EXPRESSION OF PRODUCTION AND RITUAL

It is clear that some kind of habit, custom, practice or tradition existed which created these sites, where fully functional preforms were produced and left behind on countless occasions. However, there is no reason to see this as the product of either practical/functional or ritual reasons. The functional and the ritual are often different aspects of the same context, so closely intertwined that a separation is impossible, except for analytical purposes (Lévi-Strauss 1987; Wilson 2001). The rituals of daily life always exist (Barrett 1989:115). The presence of flint nodules and the actual production of preforms for axes were obvious reasons for the significance of the sites as raw material sources and production sites. Axe preforms were produced because useful axes were required. The presence of debitage from axe production, such as flakes, at settlement sites is evidence of an extensive axe production. That axes also were used for various tasks is revealed by the many finds of worn, broken and discarded axes in settlement dumps, and by the often complete and unused axes deposited in burials and as offerings in wetland areas. However, the actual leaving behind of preforms on the beach ridges must also have involved some additional tradition. Some kind of cultural notion, a mentality, must have existed which urged or stipulated the flint knappers not only to produce but also to leave behind preforms.

CONTINUITY OF PLACE – ACTIONS AND IDEAS

The beach ridges along the Scanian coast reveal a continuity of place, a “conspatiality”, of long duration. When discussing place and action, and the material manifestations of them, it is essential also to discuss the meaning of the concept “continuity of place”. It is vital to define the concept, although not to find a general definition for all contexts, but rather to find a useful definition for this particular context. When discussing the continuity of place, the essential concepts are place, action and meaning and there are two general types of continuity of place: one concerns places that have been used during a long time for different purposes, and the other concerns places that have been used for similar types of activities through time.

As to the former type, the place is in focus. The repeated, but different, use of the place may be followed through time. Examples of this are the intentional cultivation during the Bronze Age of older settlements, probably in order to achieve better harvests, which have been ascertained in Denmark (Rasmussen 1993), the

repeated use and reuse of constructions of fire-cracked stone mounds in the interior of middle northern Sweden during the Late Neolithic and the Bronze Age (Bolin 1999), and the various archaeologically investigated sites in the Malmö region where it is common to find traces from thousands of years of different human activities within relatively small areas (e.g., Björhem & Säfvestad 1993; Rosberg & Lindhè 2001). As to the latter type, it is not only the place which is in focus, but also the type of activity (e.g., Rudebeck & Ödman 2000). This continuity of place focuses on the site as well as the repeated similar types of actions which have taken place there. The beach ridges with the extensive evidence of flint tool and preform production are examples of this latter type of continuity of place.

Hence, when discussing continuity of place in this context, the type of place I have in mind is a place that has been used repeatedly over time for a similar purpose. This purpose has been guided by apprehensions of the place and of the activities that have been performed there, and the apprehensions have come to material expression through a specific set of actions. What connects the use of the place through time is therefore not only the place itself, but the place together with the activities that have occurred there.

CONTINUITY OF PLACE ON THE BEACH RIDGES

The use of the beach ridges through time does not imply, however, that “continuity of place” should be comprehended as a continuous and repeated knapping of preforms, from the Early Neolithic to the Early Bronze Age. There were probably interruptions and periods when the sites were not visited. However, that production took place repeatedly over a long time during different parts of prehistory, is clear. In his dissertation, Per Karsten discusses the tradition of axe offering during the Neolithic (Karsten 1994). He considers this as a persistent tradition, a tradition and custom which existed throughout the entire Neolithic. The way in which the axes were deposited, that is the *action* itself, varied through time, but the general idea, the *tradition*, was probably the same. According to Karsten, this tradition was kept alive through oral tradition.

Hence, the actions at the beach ridges may have varied and changed through time. Perhaps it was customary during one time period to leave behind one preform for each preform that was taken away, while during another time period it was customary to leave behind one preform for ten preforms taken away. The result may have been that preforms produced and left behind during the Early Neolithic, were picked up and taken away for further shaping during the early Middle Neolithic. Thus there may have been great variation in how the activities were performed at these sites, although the same type of objects were involved. However, the conceptions of the place and the meaning of the actions that took place there, seem to be lasting. The places have on repeated occasions, during a very long time period, been visited with the purpose of manufacturing preforms, and preforms have during this long time period been left at the site.

The factors that linked the use of the beach ridges through time were consequently the conception of the places and the ideas of how to act there. What I have found tempting is to investigate how this shaped people's perception of the places. How did the people who sporadically or on a daily basis visited the beach ridge or moved around in its vicinity, conceive of these places? How was a find of a preform for a Early Neolithic point-butted axe apprehended by a flint-knapper who visited the place during the Late Neolithic in order to produce a preform for a broad edged thick-butted axe? How did this person "read" the older design and how did he or she perceive the craft that it manifested? What thoughts about the previous flint knappers, the craft, the place and the community which he or she were a part of, were evoked through the find of a preform for a point-butted axe?

ORAL TRADITION – NARRATIVES BEYOND THE BEACH RIDGE

Narratives and oral traditions as social interactions and as tools for communication are important to human beings and may be regarded as general and cross-cultural phenomena (Daun 1999). There are endless examples of the communicative and constitutional possibilities of narratives (Fiske 1993). Existential conditions and the fundamental meanings of human life are investigated by means of narratives. Narratives of origins, being and the future, and their association with human beings, events, objects and places are, and always have been, a fundamental part of myths and rituals (Lévi-Strauss 1987; Bourdieu 1998; Andersson m.fl. 1997; Wilson 2001). Narratives are essential, both to individual human beings and to communities.

A central point of departure in this study is the notion of places and landscapes as socially significant during prehistory. Human beings make spatial arrangements. Based on norms, the entire environment and specific places are conceived of in terms of intention and use. The cultural organisation of the landscape manifests a spatial organisation of established meanings, norms and values:

"The landscape is redolent with past actions, it plays a major role in constituting a sense of history and the past, it is peopled by ancestral and spiritual entities, forms part and parcel of mythological systems, it is used in defining social groups and their relationship to resources" (Tilley 1994:67).

Places of raw material extraction are significant in this context (e.g. Edmonds 1995, 1999; Cooney 1998). If certain places are ascribed meanings that are persistent through time and if one can accept that the meaning of places is manifested in material culture, then production sites like the beach ridges discussed here may offer insights into past human thoughts (Edmonds 1999). The sites were attractive thanks to natural conditions – the availability of high-quality flint. This caused people to seek out these places in order to extract the flint for tool production. Repeated visits through many generations turned these places into meeting places which, by way of the craft, assembled both the living and the dead, in the sense of memories of ancestors. A flint knapper (man or woman)

visiting the place accompanied by a prospective flint knapper (a child) would here meet earlier generations of the flint craft in the form of hundreds-of-year-old tools and styles. In this meeting, generations of the craft of flint knapping were passed on from older objects and forms to present and also to future flint knappers. The significance of the site in the mind of its users and visitors was hereby verified and reproduced. The preforms left behind by earlier generations may in this sense have served as a reminder of the significance of the site and of the tradition, an affirmation and legitimization of the present by means of the past and a guide-line for future action. Referring to the past is a strong argument in the creation of legitimacy and constitutes also a future warrant of authorities, powers and rights (Burström 1997; Wilson 2001). Access to, and the use of, the places may have been manifested in this kind of tradition. A flint knapper who could “read” and understand flint technology was, hence, also the person who possessed the knowledge of how to interpret the past. The privilege of the flint knapper was consequently to have a code to the past at his or her disposal.

The “insurance gear”, to use Binford’s terminology, represented by the preforms left behind, was thus not intended for the living. Instead, it may be seen as directed towards the dead, towards flint knappers of old times and earlier generations, and towards tradition – an action which involved both the past and the present. This action, to produce and intentionally leave preforms behind, should be seen as an action constituting this tradition, as an “insurance gear” for the future. The key to the tradition and to people’s affinity with these places was the narrative.

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