Early Late Neolithic Dagger Production in Northern Jutland: Marginalised Production or Source of Wealth?

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Contents

Introduction 215

Manufacture of daggers in northern Jutland: a case study 217
- Bejsebakken 217
- A flint-knapping hut or refuse area? 219
- Raw materials and extraction sites 221
- Diagnostic waste and analysis of waste from Bejsebakken 225
- Estimation of production 230
- Dagger production at Bejsebakken 234
- Dagger hoards from Hasseris Hill – gifts to the gods or commodities of exchange? 237

Social interpretation of the context of flint daggers 244

The question of skill and social complexity 248

The organisation of trade and exchange 252

Conclusion 259

Summary 260

Zusammenfassung 261

Résumé 261

Catalogue – Type I-dagger hoards in Denmark 262

Bibliography 265

Introduction[1]

In approximately 2350 BC the dagger fashion of the European continent and the British Isles reached Denmark, in particular northern Jutland. At the same time, the massive emergence of the dagger marks the beginning of the Danish Late Neolithic Period (Lomborg 1973, 10 ff.; Vandkilde 1996, 13)[2]. Due to the presence of large primary flint resources, the traditions of flint working, and the exoticism connected with this new type of weaponry – which replaced the battle axe – the dagger rapidly became popular. In the initial phases, dagger production was connected to the distribution of Bell Beaker-like pottery in Denmark. This indicates that from the onset of the Late Neolithic connections existed between northern Jutland and the continent, notably the Veluwe area in the Netherlands (Vandkilde 2005a, 30), Mecklenburg (Liversage 2003), and in some measure also the British Isles (Lomborg 1973, 92 ff.). Such connections and an awareness of new weapon types on the continent are further shown by the fact that a tanged copper dagger and a few putative daggers made on flint blades (Spandolche) are known from Denmark (Lomborg 1973, 87 ff.; see also Rassmann 1993, 16 ff., Vandkilde 1996, 180; 2005, 26). Thus, the bifacial lancet-shaped dagger was the local interpretation and imitation of more foreign types. Furthermore, the daggers probably relate to a general warrior ideal manifested in different kinds of daggers and indicating that ideology was also exchanged (Brodie 1997, 306 ff; Hodder 1982a, 207 ff.; Sarauw 2007). The fact that the daggers held symbolic importance or may even indirectly have played a role in the formation of social stratification (Olausson 2000, 131) explains the vast distribution of the flint daggers. The ideology attached to the daggers also provides an answer to the question as to why they were so desirable – especially to people in the areas where metal was scarce. The dagger production of northern Jutland was soon imitated by other regions with huge quantities of primary or secondary resources of flint such as Rügen in Germany, south-eastern Denmark, and perhaps Scania (Rassmann 2000, Apel 2001, 197). Most likely these areas formed and were part of their own production systems very similar to the system of northern Jutland.

This article has the purpose of summarising and analysing the production and consumption of daggers of type I as seen from a regional perspective. Following a long Scandinavian tradition a holistic and contextual approach is attempted, but at the same time inspiration is sought in social anthropology and analogies from this discipline. Thus, the use of such analogies and theory developed within the framework of social anthropology paves the way for

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[1] This article is part of a PhD. dissertation in progress at the Department of Prehistoric Archaeology, University of Aarhus. The dissertation analyses different aspects related to the Danish Bell Beaker phenomenon. The author is indebted to Helle Vandkilde, Berit V. Eriksen and Helle Juel Jensen for providing useful comments on earlier versions of this article. Lone Sarauw and Stacey Cozart corrected my English. Furthermore, I would like to thank the staff at a number of museums especially Viborg Stiftsmuseum, Vesthimmerlands Museum, Aalborg Historical Museum, Skive Museum, Prehistoric Museum at Moesgård and The National Museum for providing kind assistance when I was looking through their collections

[2] This article mainly deals with daggers of Lomborg's type I, which is lanceolate with a pronounced hilt (Lomborg 1973, 32 ff.). Lomborg further used the subdivision I A, I B, I A/B, I C, I D, I E and Ix, which is also used in this article.

interpretation and allows us to move beyond interpretation restricted by the present way of life and thinking. Regarding the contextual approach, contextual comparative studies add meaning to material culture, as we shall see below, and in addition provide us with a base for further interpretation.

It has long been assumed that the majority of the type I daggers were produced in northern Jutland (cf. Lomborg 1973, Müller 1902 etc.). However, very little has actually been written to describe and document such production. What was the relationship between settlement and procurement sites and how was the production of daggers organised? This article will try to remedy this situation by presenting a case study performed on ‚Hasseris Hill' situated near Aalborg and within the core area of primary flint resources. In this area a recent excavation has revealed a large early Late Neolithic settlement site by the name of Bejsebakken, only 750 metres from the contemporary flint-mining complex at Skovbakken. Along with a recent excavation at the extraction site, this settlement site reveals new information about the extent of the procurement of flint and the nature of dagger production, from mining the flint to manufacturing the dagger. My hypothesis is thus that people living at Bejsebakken knew of and were involved in the extraction of flint at Skovbakken. Furthermore, and based on the investigation of a number of dagger hoards situated in the same area, I assume that the same flint smith made most of the daggers within the single hoards. However, should such an assumption be seen as evidence of centralised and specialised workshops? Or were most men capable of making ordinary daggers? In any case, the question of skill is highly connected to the degree of social complexity, to which I shall return below.

The results of the analysis of daggers from the Hasseris Hill will further be applied in the last and more interpretive part. This part also includes the analyses of c. 550 type I daggers found in three different types of context: graves, hoards and settlement. These analyses register attributes such as size, subtype and technological quality in order to answer these questions: Do small daggers of poor or mediocre quality carry the same symbolic meaning as large daggers of supreme quality and do both of them enter into the same context? And did daggers carry the same meaning in both the area of production and consumption? Furthermore, the nature of the exchange will be discussed based on a comparative analysis of the above-mentioned daggers found in Jutland and a huge number of contemporary daggers from Norway and Sweden. The key issue is what the differences in the distribution of lengths and subtypes mean with regard to the character of exchange.

Finally, this article will discuss the extent of the production of type I daggers in northern Jutland in relation to the assumed consumption areas in Norway, Sweden and northern Germany, and place it in an explanatory framework. My hypothesis is, in accordance with other scholars, that northern Jutland served as a connecting link between areas towards the south where metal was more easily obtainable and the rest of south Scandinavia.

Manufacture of daggers in northern Jutland: a case study

This part of the paper analyses the dagger production exemplified by the early Late Neolithic settlement site of Bejsebakken, which is situated within the heart of primary flint resources. It analyses the debitage from a supposed flint knapping hut as well as a selection of daggers and preforms. This material is further related to the material from the nearby flint mines. Furthermore, six dagger hoards from the area are examined. A more general presentation of the Bejsebakken settlement is nevertheless necessary in order to get a clearer picture of the context in which the production and some of the extraction took place.

Bejsebakken

Bejsebakken is located in northern Jutland near Aalborg on a place called Hasseris Hill *(Fig. 1),* a 4.5 km long and 2.7 km wide limestone formation (Sarauw 2006). The large seascape of the Limfjord is situated 2.8 km from Bejsebakken, and two streams, Hasseris Å and Østerå, run west and east of Hasseris Hill respectively. The precise level of the fjord in the Late Neolithic is not known, but in the Mesolithic Hasseris Hill and several other limestone formations in the area were islands. Thus, today Hasseris Hill is surrounded by raised seabeds.

A large part of the Bejsebakken plateau, which is situated up to 57 m above sea level, is surrounded by a built-up area and a churchyard. Until recently the area was used for farming, and as a result, traces of ploughing can be seen in the subsoil in many places. Even though the subsoil is mostly sand and clayey sand, white chalk and gravel also occur.

During 1999–2000 prior to construction work and town development, Aalborg Historical Museum excavated c. 80,300 square metres. Apart from settlement traces from the Late Iron Age (Nielsen 2002; Ørsnes 1976) in the north-eastern corner of Bejsebakken, the excavation revealed a large Late Neolithic settlement consisting of 23 houses, culture layers, pits and so on *(Fig. 2).* In contrast to the Iron Age settlement, the Late Neolithic houses clustered in three or four groups towards south and west.

Apart from two protected burial mounds situated towards the south between two concentrations of Late Neolithic houses, several other burial mounds are known from the area. One of these was excavated in 1972. Below the burial mound a sunken-floor house *(Fig. 2, A222)* was found, but it was not discovered until the burial mound was re-excavated in 1999. Another barrow, located towards the NE, contained a disturbed stone cist. At the level under the barrow, a pit and plough marks resulting from criss-cross ploughing were found. The burial mounds probably date back to the Early Bronze Age.

The houses with and without sunken floors were two-aisled constructions and were very similar with regard to size, typically varying from 70 to 110 square metres *(Fig. 3)*. Not included in this is a group of smaller sunken-floor buildings, which should be regarded as store- or outhouses belonging to a larger farm *(Fig. 4)*. An example of such an outhouse will be described in detail below, since this house is thought to have functioned as a flint-knapping hut.

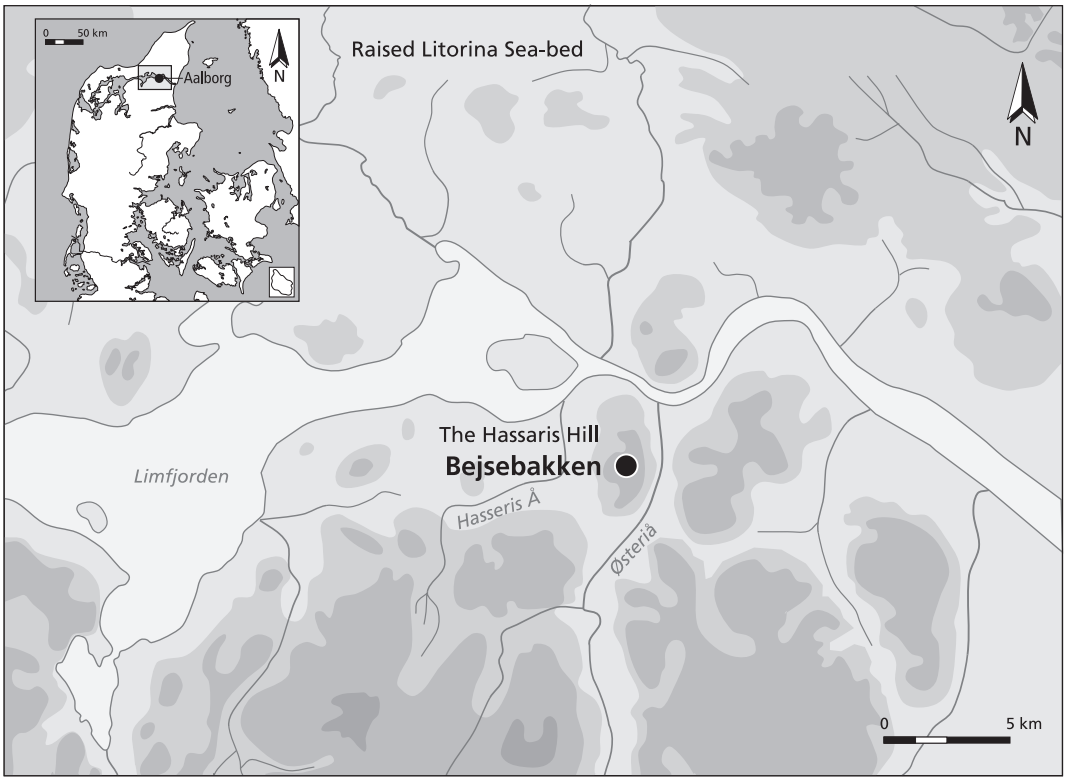

Fig. 1. Map of the area showing the position of Bejsebakken and the raised Litorina sea bed. The darker the colour, the higher the location of the area. Drawn by Jan Slot-Carlsen, Aalborg Historical Museum.

In the large sunken-floor houses the eastern end was dug as deep as one metre into the soil. This part of the house should probably be seen as part of the habitation area or as an area used for storage or work. In a number of houses three to five depressions were found at the bottom of the sunken floor, indicating that special activities sometimes took place here. Other houses contained traces of fireplaces, usually in the sunken part or where the sunken part meets the non-sunken part.

The sunken part of the longhouses, which typically were used as disposal areas when a site was abandoned, contained very rich find materials, consisting primarily of thousands of flint flakes sometimes in massive depositions, indicating that flint as a raw material was present in large quantities. Furthermore, flint tools, potsherds, charcoal and fire-cracked stones were often found. No bones have been preserved. The find materials in combination with the radiocarbon datings clearly place the settlement within the early Late Neolithic Bell Beaker milieu of northern Jutland, approximately 2350–2000 BC (LN I) (Vandkilde 2005a, 9).

In general, the two-aisled houses without sunken floors were all similarly constructed. They were orientated almost E-W though with a slight angle to the north–west and measured c. 5 × 15 m *(Fig. 3).* Five roof-supporting postholes were typically placed along the central axis of the houses, sometimes in connection with minor posts, which may also have had a roof-supporting function. In two of the houses traces of a double post setting consisting of outer and inner wall posts were found to the north, whereas only a single row of posts was present to the south. No clear signs of entrances could be seen. The two-aisled house shown in *Figure 3*

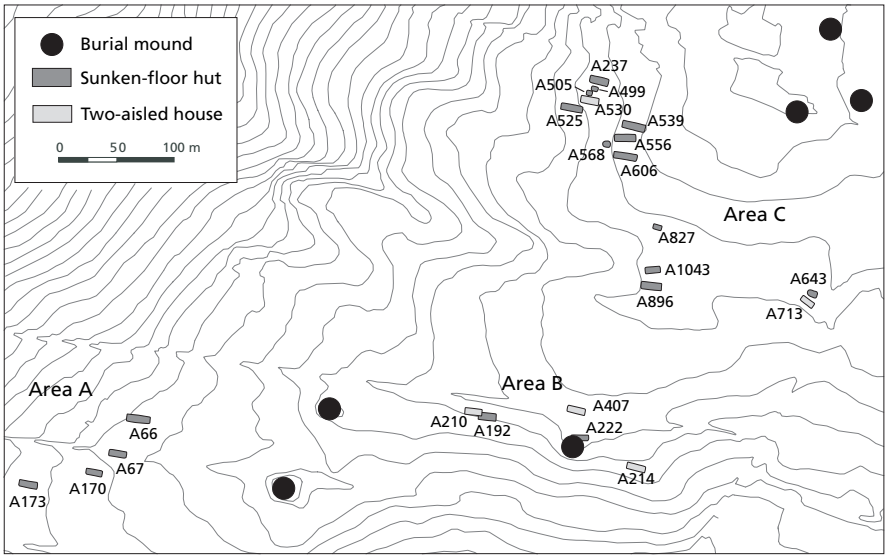

Fig. 2. The distribution of two-aisled longhouses, sunken-floor huts and burial mounds at the Bejsebakken settlement. The equidistance is one metre.

contained two possible storage pits, whereas in another house a small pit that may have been used as a fireplace was found.

A number of radiocarbon dates placed the two-aisled longhouses in the early Late Neolithic (Sarauw 2006). Artefacts found in these houses are few. However, in one house (A210) four bifacial flint sickles of different types were found in two postholes. Similar offerings are well-known from other contemporary sites in South Scandinavia (for instance Artursson 2000, 27; Björhem and Säfvestad 1989, 59; Michaelsen 1989, 82). In a Danish context, houses corresponding to the ones from Bejsebakken are known from the late Single Grave Culture (Boas 1993) as well as from the Late Neolithic and Early Bronze Age (cf. Nielsen 1998).

It is likely that two or three farms were located at Bejsebakken within a period of 200–300 years and from time to time moved around within a large resource area reflecting a rather dispersed and labile settlement structure. Plough marks under a barrow and at the bottom of three sunken floors show that the area was intensively used for cultivation. In addition, numerous bifacial flint sickles, fragments of quern-stones and carbonised grain indicate that farming and most likely animal husbandry played a major role in the subsistence economy. As we shall see below, the production of daggers might somehow have contributed to this economy.

A flint-knapping hut or refuse area?

In connection with this work it has been impossible to examine all the flint waste from Bejsebakken. Instead, the material from a single house construction, A505, has been selected in order to investigate what information could be extracted from the lithics with regard to the production of tools, raw materials used and so on. The results of the analysis of the waste from such a single house site within a larger settlement area covering a time span of approximately 200–300 years should of course not be applied to the site in general. Instead, the waste gives an up-to-the-minute account with regard to the strategies used in the production of tools and the

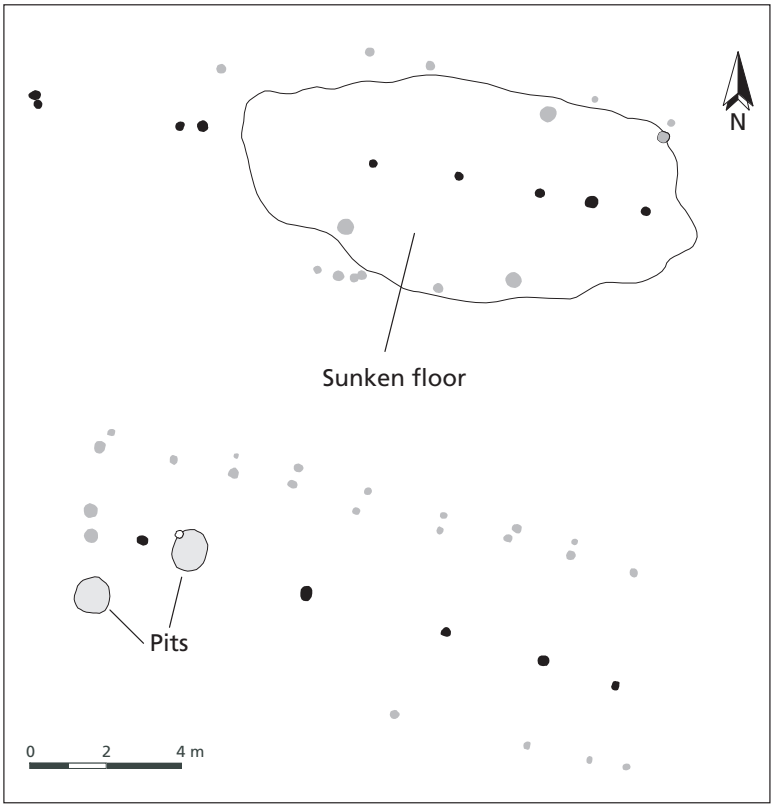

Fig. 3. Example of two-aisled longhouses with and without sunken floor at the Bejsebakken settlement.

procurement of raw materials. However, these analyses along with the analysis of daggers and preforms, and a comparison of these with some of the material found at the nearby mines, give some overall indications as regards such parameters as the raw materials used, the production process and the organisation of the production.

The house, A505, was a smaller, atypical construction measuring c. 5 m N-S and 4.5 m E-W and containing an irregularly shaped sunken part surrounded by posts *(Fig. 4)*. The depression, which made up most of the floor area of the house, was up to 20 cm deep *(Fig. 5).* The fill in the depression was uniform and consisted of dark greyish-brown sandy humus. The northern side created a small terrace on top of which lay a concentration of several thousand flakes, part of which were microscopic trimming flakes. These flakes as well as a smaller concentration on the southern side of the depression most likely reflect that the interior of the house had been cleared thoroughly at some point in time. Correspondingly, the central parts of the depression contained surprisingly few finds.

The postholes surrounding the depression are thought to be the remains of the roof-supporting construction of the house. Especially the two western postholes, which both contained large quantities of flint waste in the upper part, had solid foundations with diameters of 30 cm and depths of 48 and 50 cm respectively, whereas the rest of the postholes had diameters of 20–30 cm and depths of 14-22 cm. This might reflect the fact that the westerly wind also prevailed at that time.

Based on the dagger material including an almost intact type I dagger *(Fig. 6)* and a few ornamented sherds decorated with comb impression and horizontal grooves, the site is to be

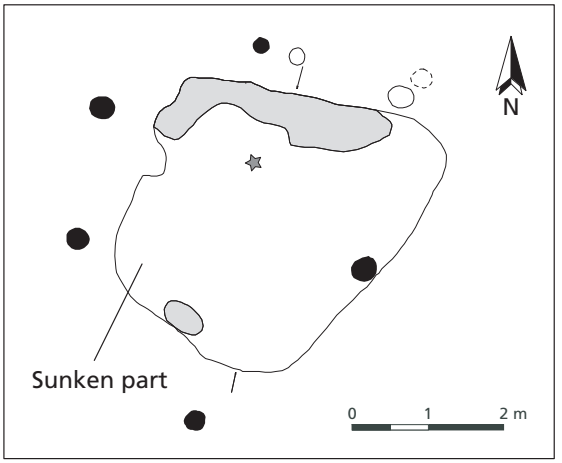

Fig. 4. The outhouse A505 situated at the Bejsebakken settlement. Flint concentrations are shown in grey. The dark-grey star indicates the find place of the small concentration of biface thinning flakes.

dated to the first part of the Late Neolithic Period. This date could nevertheless not be supported by a radiocarbon date of charcoal (oak) found in the fill and dated to 2030–1880 BC (68.2 % probability, AAR-8881). This is probably due to the fact that the charcoal must have been mixed in later.

Most of the material found in the fill, including fire-cracked stones, flint waste, and some pottery, was in all probability deposited shortly after the house was abandoned and is thus younger than the period of use and than the flint concentration. However, from an archaeological point of view the find material is more or less contemporary – even though the waste in the flint concentration and in the fill, respectively, could reflect different strategies of production or reduction sequences. Concerning the flint concentration the key question is, however: Does the concentration of flint represent primary or secondary refuse (Schiffer 1987, 58 ff.)? I.e., is it a cleared-up flint-knapping floor or did all of the waste in the depression just reflect a secondary deposition after the house was abandoned? The analysis of the flint waste below will further investigate this topic, but first let us take a closer look at the extraction sites in the vicinity.

Raw materials and extraction sites

Approximately 750 m north of Bejsebakken we find the Late Neolithic mines at Skovbakken (Becker 1951a; 1951b; 1959; 1993; Bower 1953 and Grantzau 1954) – a site that the people living at Bejsebakken were probably familiar with and somehow used. In this area, layers of flint were situated in the uppermost parts of the white chalk deposits which constitute the subsoil; most likely people accidentally became aware of the flint and started to exploit this resource. The following part reviews the old excavations at Skovbakken and adds new information which indicates that the extent of the extraction is much more comprehensive than previously assumed.

The primary flint deposits on Hasseris Hill and in the eastern region of the Limfjord is Jutlandic Senonian flint according to Beckers terminology, geologically dated to the Maastrichtian or the upper Cretaceous Period (Berthelsen 1987, 12 ff.). The flint extracted from the white chalk is characterised by a thick porous white crust of which the inner part is harder and more

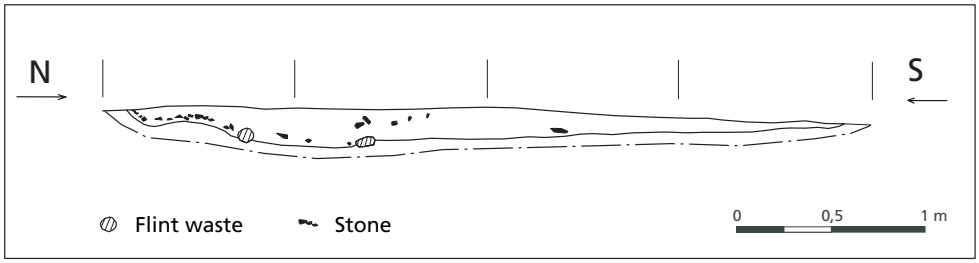

Fig. 5. E-W-section through the sunken part of A505. Flint flakes are shown in black.

compact (Gry / Søndergaard 1958, 10). The colour of the flint, depending on whether the surface is fresh, varies from grey to dark-grey to black (Becker 1993, 124 ff.). However, such variation in colours also occurs within the same nodule (Gry / Søndergaard 1958, 9). Besides, the flint often contains small white or grey flecks in larger or smaller numbers. Sometimes these flecks vary from a millimetre to several centimeters in diameter. The flint outcrops in the Aalborg area are of rather poor quality in comparison with other areas with primary flint resources such as eastern Zealand (Berthelsen 1993, 87; Gry / Søndergaard 1958, 9; Thomsen 2000, 31). This lack of quality is reflected in the modern exploitation of the chalk. When quarries are dug ten to twenty metres into the modern surface today, the chalk typically only yields one layer of relatively small flint nodules with a maximum length of 20–25 cm (Becker 1993, 111). However, these estimations of sizes given by Becker should be judged with some reservation. Becker reports that the largest nodule found at Skovbakken measured about 50 × 40 cm (Becker 1951b, 139).

Approximately 15 shafts have been excavated within four rather small areas and the extraction site has been estimated to have covered approximately 5000 square metres in total (ibid.). However, in 1992 six trial trenches were laid out on the western part of Skovbakken prior to the construction of a path[3]. The trial excavation revealed 20 new shafts, of which only three were excavated in part. This suggests that the mining area originally covered an area almost two and a half times larger than Becker suggested *(Fig. 7).* Within all the areas excavated at Skovbakken, which is approximately 780 square metres in total[4], 50 mineshafts were recovered, indicating that originally more than 800 shafts could have been present in this area. The shafts discovered in 1992 were typically constructed where old sand-filled sinkholes in the chalky subsoil were already present in the past. When using these sinkholes as starting points for mining shafts much hard labour was saved since the chalky subsoil gets very hard especially in the lower parts (Becker 1959, 92).

The excavations of the 1950s showed that the mines typically measured one to two metres in diameter at the surface and that the shafts were funnel shaped in the upper part and widened out towards the bottom *(Fig. 8).* Here the transverse measurement could be up to 3.2 m. The flint layer was typically only exploited a little towards the sides to avoid subsidence of the shaft. Instead of following the flint layer further into the sides to form galleries, new shafts were constructed close to the old one. In this way, people knew in advance at which depth to expect the seam. The depth of the shafts thus varied depending on the depth of the flint layer and the slope of the terrain. The maximum recorded depth was 4.7 m, but towards the south where the terrain sloped down and the flint layer was therefore relatively close to the surface, the shafts

[3] The artefacts and excavation report is kept in Aalborg Historical Museum, journal no. ÅHM 2683.
[4] Only excavated areas within the dotted line in fig. 7 are included in this.

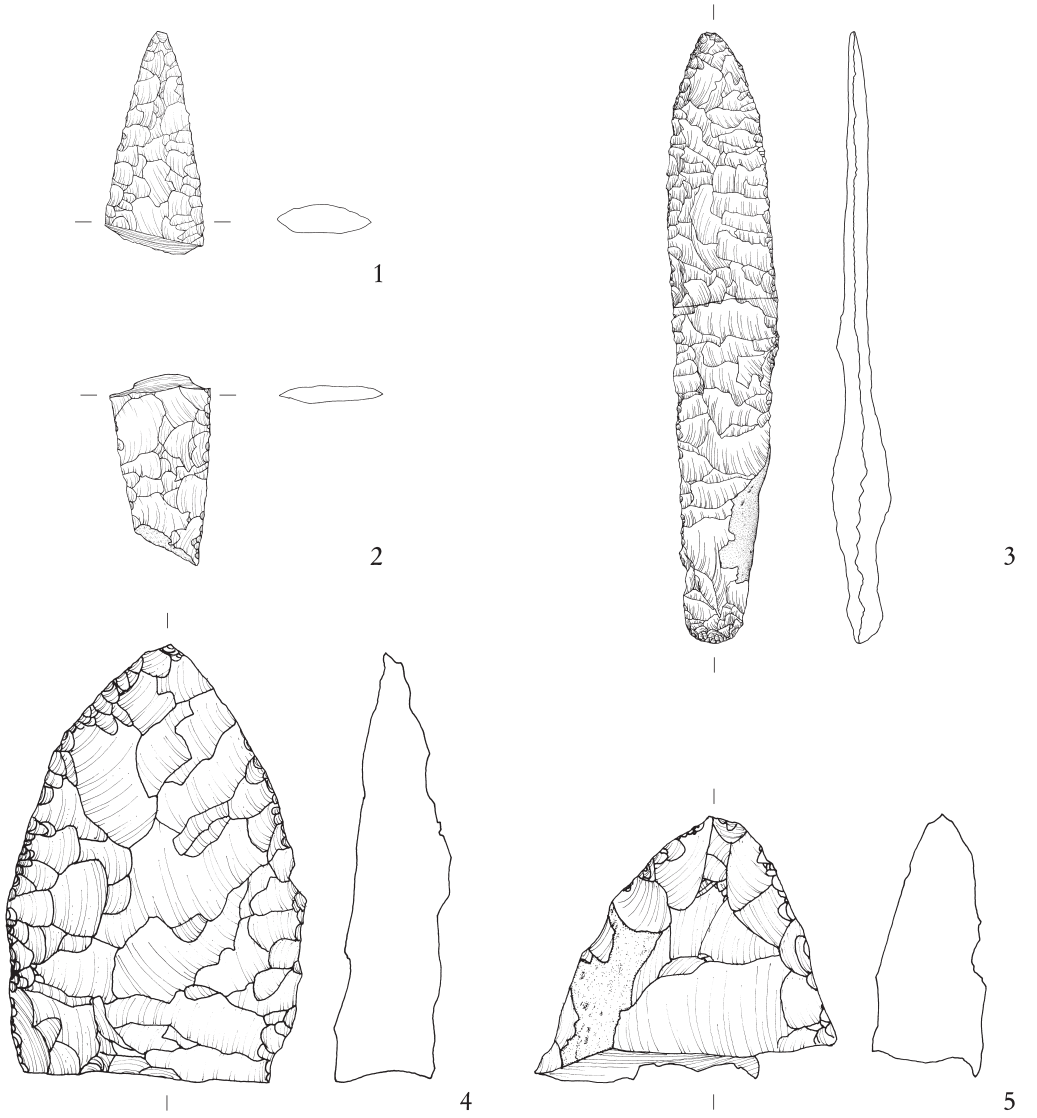

Fig. 6. Fragmented daggers (1–2), a dagger (3), and preforms (4-5) found in house A505. Drawn by Jeppe B. Jepsen. Scale 1 : 2.

had a more pit-like character. When an old pit was abandoned it quickly became filled with a mixture of chalk, earth and flint debitage originating from the construction of new shafts and from other activities taking place near the mines such as cooking and flint knapping. This is documented through the presence of broken nodules, hammer stones, preforms and flint debitage, which in addition showed that in some case the first rough knapping, which most likely also served to test the quality of the flint, took place at the site. These presumed ‚knapping floors' were situated in old, partly filled shafts as well as on the surface in between the mines. The occurrence of oyster shells, several fireplaces, and a few bones from a cow and a small pig showed that different kinds of activities not directly relating to mining also took place at the site (Grantzau 1954, 36 ff.).

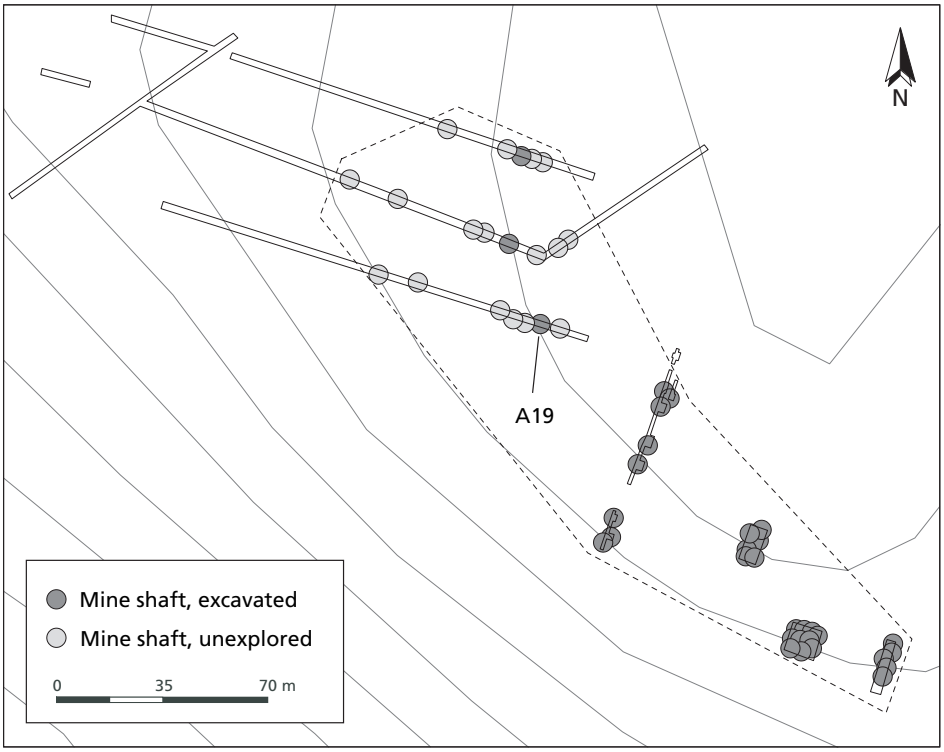

Fig. 7. Distribution map roughly showing the location of all known mines at Skovbakken including shaft A19. The dotted line indicates the assumed extension of the mining area covering an area of c.13,750 square metres. The equidistance is 2.5 metres.

In several of the mining shafts dagger preforms were found (Becker 1951b, 149; Grantzau 1954, 38 ff.). Along with the presence of 19 type I flint daggers found in a shaft they date the major part of the mines to the early Late Neolithic (Becker 1951b). Furthermore, the filling in the shafts contained much flint debitage in the shape of broken nodules, decortification flakes and discarded cores. However, in connection with the excavations in 1950 and 1952 only a very limited selection of flint waste was collected and saved. In connection with the aforementioned trial excavation carried out in 1992 a section was made in three shafts as deep as c. 1–1.5 m. All the material from these sections was collected and it gives a good indication of the reduction strategies with regard to the first working of the nodules. One of the partly excavated shafts, A19, contained 20.6 kilos of flint waste or 439 pieces *(Table 1)*. All the waste was slightly patinated in white and blue colours and consisted of Senonian flint. Approximately 81 % of all the flint waste had a cortex either consisting of porous white chalk or of thin and abraded darker white crust. The last-mentioned type of cortex, which could also be seen on nodules with porous white chalk, must be due to the fact that some nodules were somehow exposed to rain, which had washed off the white chalk. Today similar nodules can be found along many Danish shorelines where the sea has done the cleaning.

As calculated from the data in table 1, the material from the shaft primarily consisted of broken nodules and large decortification flakes removed by percussion – both types of waste must be interpreted as the result of testing the quality of the flint, and in some cases, as the first coarse chipping. In this way unnecessary transportation of un-worked nodules of unknown or

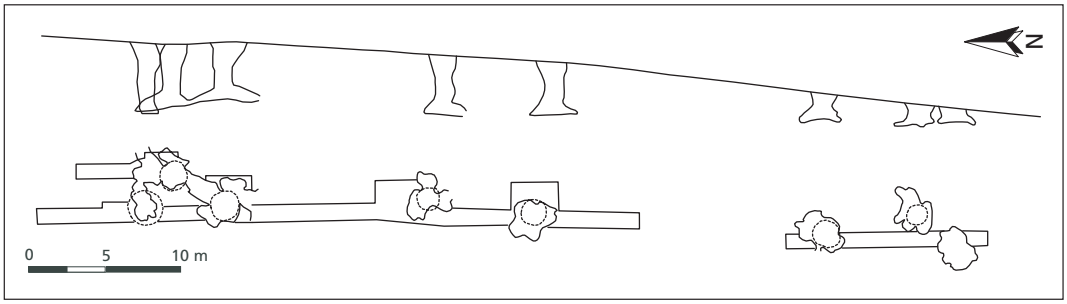

Fig. 8. Example of plan and section showing some of the mines excavated in 1952 at Skovbakken. Redrawn from Grantzau 1954.

poor quality was avoided. These results are in accordance with observations made in 1950 and 1952 (Becker 1951b, 142).

Further extraction sites are known from the eastern part of the Hasseris Hill *(Fig. 9)* but are less well known. Additional sites should be expected to appear in the future on the raised limestone formations in the Aalborg area where the subsoil predominantly consists of white chalk.

As indicated above, continuously large-scale extraction took place on Skovbakken in the early part of the Late Neolithic. Due to the enormous amounts of flint waste and tools found at Bejsebakken and the short distance to the mines at Skovbakken, extensive dagger production might have taken place here. However, were daggers actually produced at Bejsebakken and in what numbers? And how was the finished product with regard to size and quality? A closer examination of the debitage of a single house site might shed light upon some of these questions.

Diagnostic waste and analysis of waste from Bejsebakken

Before the classification of waste from the assumed flint-knapping hut, A505, it is necessary to describe certain typological attributes of the flakes, in order to be able to examine the kind of production that took place and to attempt a rough classification of the flint waste from the house site[5]. Thus, research based on refitting and experimental manufacturing of flint daggers and axes has shown that parts of the debitage are quite diagnostic as regards the specific kind of production that took place at a given site (cf. Apel 2001, 151 ff.; 163 ff.; Arnold 1981; Hansen / Madsen 1983; Högberg et al. 2001, 205 ff.; Högberg 1999; 2001; Stafford 2003). In the period in question two different types of production are thought to be of relevance: 1 – the production of bifacial tools especially flint daggers and 2 – the production of square-sectioned axes. The last-mentioned type comprises a number of different, partly chronologically significant types (cf. Högberg 2001, 175; Nielsen 1977), but in a Late Neolithic context only the thick-butted axes and adzes are of interest (cf. Jensen 1973, 84 ff.).

With regard to the production of square-sectioned axes and blanks, some of the typical characteristics on debitage from the middle and late stages are flakes with a faceted platform with an angle of 90 degrees and a lenticular shape (Apel 2001, 152; Hansen / Madsen 1983;

[5] In the analysis below, the material from the flint concentrations in A505 and the fill will partly be analysed together. Still, the differences in deposition mentioned in chapter 2.2 should be kept in mind.

	Waste – total (A505)		Waste – concentration		Waste – flint mine A19	
Waste	**Number**	**Weight (gr)**	**Number**	**Weight**	**Number**	**Weight**
Nodules					36	9630
Cores and core remnants	33	6052	5	1544	4	415
Atypical worked flint	9	419	3	99	1	76
Splinters and greatly fragmented flakes less than c. 1.5 × 1.5 cm		4444		1761		
Bifacial thinning flakes – c. size 1–4 cm²	1211	2414	617	1132		
Bifacial thinning flakes – c. size larger than 4 cm²	325	1999	173	907	1	9
Flakes from the production of square-sectioned tools	224	2243	82	700	11	136
Pressure flakes		149		62		
Flakes difficult to classify (fragmented flakes, miscellaneous)	622	8381	235	3194	125	1872
Primary and secondary decortification flakes	460	4464	208	1651	257	8225
Firecracked flint	53	228	12	13		
Total	2937	30793	1335	11063	435	20363
Tools and preforms						
Daggers	3	72	1	11		
Axes	1	93				
Retouched flakes / ad hoc tools	48	705	10	100	3	130
Unspecified bifacial object	7	160			1	111
Scrapers	10	199	2	26		
Borers	2	54	2	54		
Burins	8	45	4	15		
Preforms – daggers	3	445	2	370		
Preforms – arrowheads	1	5	1	5		
Total	83	1778	22	581	4	241
Hammerstones (rock)	9	2326				

Table 1. Classification of flint waste and tools from house A505 and the shaft, A19.

Högberg 1999, 85 ff.). Furthermore, the impact point is typically placed behind the edge, the bulb is pronounced, and the profile of the flake is straight (ibid.). The blank is reduced through four-sided surface-flaking known as the quadrifacial method, which results in a blank with a squared cross-section (Högberg 1999; Högberg et al. 2001).

In a similar manner, typical debitage from production of daggers and bifacially knapped sickles contains bifacial thinning flakes characterised by their thin and curved profile and diffuse bulb, indicating that a soft technique was used to remove the flake (Apel 2001, 152). Additionally, the platform angle is often c. 45 degrees and the point of impact is marginal, i.e. placed on the edge. Furthermore, it has proved possible to separate the bifacial thinning flakes into early-stage and late-stage flakes depending on the number of scars on their dorsal surface (Yerkes / Kardulias 1993, 96; Fig. 2). However, this is not attempted in this work. It should be stressed that bifacial thinning flakes are produced during the preparation of the cutting edge on square-sectioned axes, but only in relatively small numbers (Arnold 1981, 154, Fig. 1; Apel 2001, 168). As mentioned above, the bifacial method, where the blank is reduced through two-sided flaking, is also used in the production of other bifacial tools such as cres-

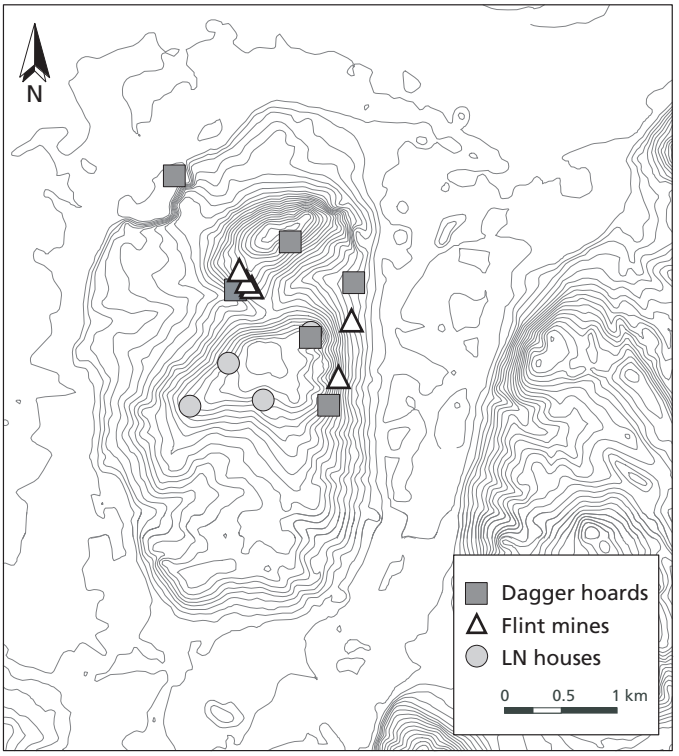

Fig. 9. The three house concentrations on Bejsebakken and the distribution of flint extraction sites and flint dagger hoards on Hasseris Hill. Listed from the west the dagger hoards are Vesterkjæret, Skolebakken Øst, Mølleparken, Bejsebakken, Valmuemarken, and Aalborg Byjord – see the catalogue. The equidistance is 2.5 metres.

cent-shaped sickles. The late-stage reduction waste from the production of sickles cannot be separated from the waste from the production of daggers (Stafford 2003, 1541). In such cases the general impression of the waste, and especially the presence of tools and preforms broken during manufacture must decide what kind of production took place. As an example, pressure flakes characterise the last stages in the reduction both before and after the grinding of especially daggers of the I C subtype (Stafford 2003). Still, occasional pressure-flaking also occurs on both sickles (Eriksen in prep.) and daggers of other subtypes (e.g. I A and B).

Returning to house site A505, almost one hundred percent of both waste and tools was made of Senonian flint displaying an extremely uniform raw material. Only a few pieces differ: a couple of patinated flakes of flint from glacial sediment, a small thick-butted axe, and a flint dagger in two pieces. The axe was made of coarse grey Danian flint, while the dagger was most likely also made of Danian flint, but of another variety with a high content of bryozoans. These tools were probably brought in from outside or made of flint nodules found in the local moraine, or perhaps extracted from other sites. On a couple of worked pieces a small part of the surface was completely covered with white patination, which is caused by the nodule being exposed at some point. The Senonian flint is very similar to the flint found on the extraction sites and described above, i.e. dark-grey to black flint spotted with small white or grey flecks of varying sizes. In total, 31.1 % of the flint waste and tools had a cortex. At another and partly contemporary settlement, Myrhøj, also situated close to the Limfjord in northern Jutland, c. 35–47 % of all flakes had cortex (Jensen 1973, 80). This rather high percentage is caused by the

fact that a large part of the raw material is thought to have been small beach pebbles (ibid.). 22 % of all flint tools and waste from the house A505 at Bejsebakken consisted of porous white crust with a thickness of approximately 1–3 mm. On the surface of the crust cutting marks could sometimes be seen, most probably originating from flint tools in connection with the removal of the white chalk on the nodules. Similar observations have been made on nodules found in the shafts (Grantzau 1954, 56). Furthermore, a rough examination of the secondarily deposited flint waste in the other houses revealed huge quantities of waste containing similar cortex.

Returning again to house A505: on another 9.1 % of the material the cortex was weather worn and greyish and showed no traces of chalk. Probably this waste came from redeposited nodules which were found in the local moraine, but apparently had a quality suitable for smaller tools intended for everyday use. Flint waste having similar cortex was not present among the waste found in the shaft A19. Apart from the cortex, the flint was identical and could not be separated when compared macroscopically. Thus, the colour and texture were the same and both were almost completely lacking patina and very ‚fresh' and sharp-edged. The degree of cortex should be seen as reflecting the size and shape of the nodules being worked. However, the degree of cortex could also reveal the strategy used in the reduction process. The question being, did the first rough shaping of the nodules in general take place elsewhere, for example at the mines, as documented in some cases (Becker 1993, 112)? And were the blanks then made into finished tools at a different place, for instance at Bejsebakken? The high percentage of flakes having cortex does, however, indicate that some decortification on site was rather normal.

As seen from table 1 worked flint larger than c. 1.5 × 1.5 cm constitutes 3020 pieces amounting to c. 32.6 kg. Among these, 1357 pieces or 11.6 kg could without any doubt be assigned to the flint concentration, but it cannot be ruled out that parts of the waste in the filling belonged to the same stratum. Of the total quantity of flint, almost 4.4 kg represent splinters and fragmented flakes of less than approximately 1.5 × 1.5 cm. This is estimated to amount to 11,750 pieces[6].

The cores were typically flat and rectangular with a thickness of c. 3–5 cm, often holding a porous cortex on two or more sides showing the original thickness of the nodules – even though more irregular ones also occurred. The fact that 64 % of the cores or core remnants had a porous cortex whereas only 27 % had an abraded cortex indicate clearly that a huge part of the raw material were nodules most likely extracted through mining or from a site where primary deposits of flint were exposed. Many had three or more striking platforms and some were discarded due to impurities or cracks in the flint. The average weight of the cores was c. 200 g. The cores were in general not totally exhausted, and along with the huge quantities of flakes this indicates that raw materials for smaller tools were easily obtainable.

As seen from table 1, most of the flakes (54 %) were bifacial thinning flakes as defined above, whereas only a minor part (7.9 %) seems to be the result of the production of square-sectioned tools. These statistics are supported by the huge quantity of micro-debitage, which documents that some sort of tool production took place – and most likely a tool production where a careful preparation of the platform was essential if the flint knapper was to succeed. Precisely such a careful preparation of the platform in order to prevent it from breaking during impact is characteristic of the production of bifaces (Apel 2001, 152; Whittaker 1994, 194). When producing axes the striking platform does not need the same degree of preparation (ibid.). Naturally, the group consisting of small bifacial thinning flakes dominates. This should be seen in relation to the size of nodules and preforms and the final product – daggers of a limited length (see below). Obviously long and broad nodules produce more flakes of all sizes than smaller ones.

[6] This is an average calculation based on the counting and weighing of 550 pieces.

Fig. 10. Example of two bifacial thinning flakes found at the bottom of A505 as part of a small concentration consisting of 16 large flakes, most of which were bifacial thinning flakes. Drawn by Jeppe B. Jepsen. Scale 1 : 2.

Furthermore, at the bottom of the depression towards the northeast, a concentration of 16 large flakes was found, most of which were bifacial thinning flakes *(Figs. 4, 10).* These flakes represented a careful and uniform selection of flakes, many of which were suitable as blanks for the production of pressure-flaked arrowheads (cf. Apel 2001, 217 ff.). Nevertheless, no arrowheads or fragments, and only one possible roughout, was found among the waste. This indicates that such production did not take place in the house. Traces of the production of arrowheads are, however, present in other nearby houses. The concentration of flakes along with others found in other houses at Bejsebakken must therefore either represent a cache or some kind of sacrifice with a meaning similar to those found in other house sites but including daggers, sickles, scrapers and so forth (cf. Björhem and Säfvestad 1989, 59; Michaelsen 1989, 82; Sarauw 2006).

Among the waste, 149 flakes can be interpreted as presumable pressure-flakes perhaps indicating that daggers of the I C subtype were made at the site *(Fig. 11).* However, only two fragments showed signs of grinding in combination with negative flake scars *(Fig. 11),* as we shall see in the next part of this paper, and as demonstrated by the dagger found in house A505, daggers with parallel-flaked blades occasionally occurred on the site. However, the daggers in question were not of a quality comparable with that of the daggers found in the graves. Furthermore, the presence of pressure-flakes may also be due to the fact that pressure-flaking was probably also sometimes used on other subtypes than I C in refining the surface of the dagger.

The rather large group comprising unclassifiable flakes should be interpreted as a kind of left-over-group. The characteristics of the group of flakes classified as flakes from the production of square-sectioned tools have been described above. Among other things, the flakes in this category are in general thicker and heavier than the bifacial thinning flakes, and both hard and soft techniques are used in removing the flake. The average weight of the flakes is c. 10 g, whereas the average weight of bifacial thinning flakes larger than four cm is 6.1 g. This rough comparison does not take into account the size of the flake. However, Apel has shown that the density of bifacial thinning flakes is in general smaller than the density of flakes from the production of square-sectioned tools or behind-the-edge flakes, according to Apels terminology (Apel 2001, 172–173).

Among the tools, retouched flakes and ad hoc tools dominate – i.e. flakes with retouch, notches and so on. In spite of this we might question whether this group represents ‚real' tools or whether it should be seen as the accidental result of, for instance, a child playing or learning. Scrapers made on flakes and burins on a break are also common. One burin is made on a broken

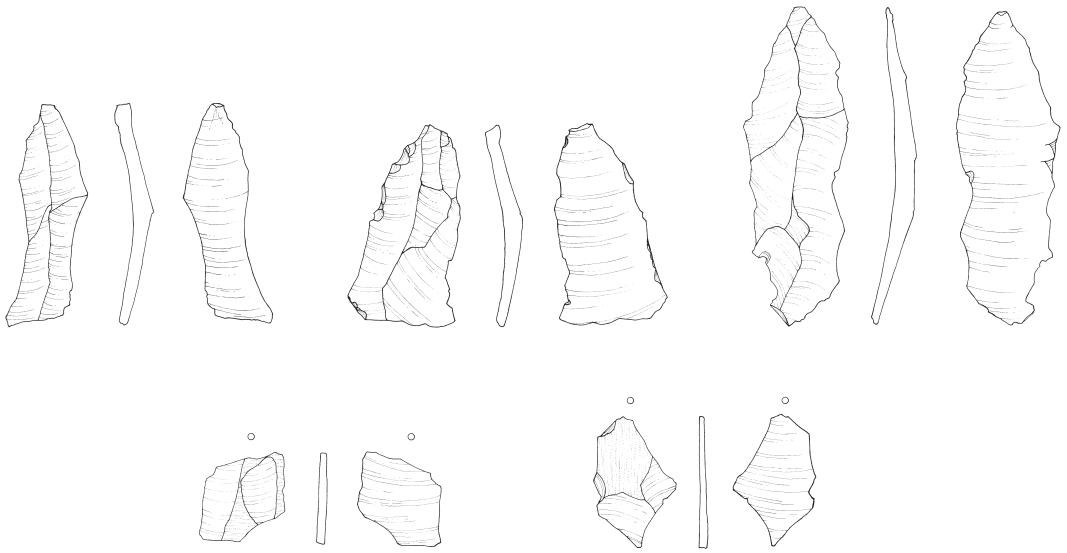

Fig. 11. Example of three assumed pressure-flakes and two fragments of pressure-flakes with partial traces of grinding from the production of daggers of the I C subtype. Drawn by Jeppe B. Jepsen. Scale 1:1.

dagger or a preform. As well as the above-mentioned thick-butted axe and dagger found in two pieces, two other pieces of daggers were found: part of a hilt and part of a blade – both probably broken in the last stages of the refining process, but nonetheless showing that a skilled flint-worker was involved *(Fig. 6).* The dagger preforms, two of which were broken and discarded, were broad and almond shaped. The hammer stones are typically oblong with two or more sides showing marks from striking. All are made of rock, especially quartzite and granite.

In conclusion, we may claim that the production of flint daggers is well documented at the house site A505 due to the vast amounts of debitage from all stages of manufacture deposited in the flint concentration and in the fillings. Furthermore, the majority of the raw material was mined flint. Flint waste indicating dagger production includes vast numbers of bifacial thinning flakes, micro-debitage from platform preparation, and pressure flakes as well as roughouts, dagger fragments probably broken in the refining process and one dagger in two pieces. The last-mentioned dagger was, however, made of Danian flint, which might indicate that it was brought to the site – maybe to be re-sharpened – but instead the dagger broke[7]. What was the size of the production represented in the waste from the different depositions in the small house site? How long was the period over which the waste was produced?

Estimation of production

This section provides some conclusions regarding the dagger production in general and the function of the small house site. Due to the normal state of preservation of most settlement sites we only have very little comparative information concerning the organisation of flint knapping in Late Neolithic settlement sites. Was, for instance, flint knapping always carried out outside

[7] The dagger blade and the hilt were found about 20 cm from each other and they probably belonged to the same stratum as the flint concentration.

the houses or did exceptions occur? Besides, the waste from an experimental manufacture of type I daggers done in order to get further insight into the size of the production is related to the flint waste from the house at Bejsebakken. Does the waste, for example, only represent the production of a few daggers or are several daggers represented? Furthermore, were axes also produced and to what extent?

Experimental reproduction of axes has shown that huge quantities of waste can be generated in a very short time (Hansen and Madsen 1983). Therefore, we should be very careful when giving estimations regarding, for instance, the size of production based on a selection of prehistoric material. Reproduction of 15 daggers of the I C subtype has demonstrated that the manufacture of a dagger, ready for grinding but comparable to finished daggers of subtypes I A and B, took only two and a half hours (Stafford 2003, 1541). However, these daggers were approximately 30 cm long, which is more than twice as long as many of the daggers found at Bejsebakken. Accordingly, the time spent on the production of such small daggers would probably be somewhat shorter than that. Similar experiments concerning the manufacture of flint daggers of type IV (so-called ‚fish-tailed' daggers) produced 3000–4000 individual pieces of debitage larger than one square centimetre (Stafford 1998, 345). At the early Late Neolithic site of Tegelbarg, situated by the Baltic Sea in northern Germany, a secondary deposition of flint waste was found representing the waste from dagger production, as subsequent refitting of the waste documented (Arnold 1981 and 1990). Eighty-seven flakes belonged to a dagger roughout, 80 flakes to a broken, unfinished lancet-shaped dagger, and only a few flakes could be assigned to a knife. To the fourth piece 155 flakes could be attributed revealing that the final product was a lancet-shaped dagger, even though this was not present at the site. An atypical blank, a c. 19 × 10 × 4 cm large flake, could be reconstructed. Furthermore, the refitting showed an almost complete reduction sequence. The finished dagger is estimated to have been 18 cm long, four cm wide, and 0.5–0.6 cm thick. What is interesting here in relation to the flint waste from Bejsebakken is the fact that even though not all flakes were present, among other things because the decortification took place elsewhere, no more than 155 flakes plus micro-debitage constituted the waste from producing one dagger. Even if the number of flakes was twice as large it is still rather low compared to the numbers produced by Stafford. Other numbers are provided by Anders Högberg in his analysis of the material from the experimental production of a bifacial dagger preform (Högberg, 1999, 85; Fig. 7). The reduction sequence from nodule to preform (stage three in the terminology of Högberg) produced 234 flakes (pers. comm.).

In order to obtain comparative material and to provide a clearer picture than the somewhat contradictory information mentioned above, two small-scale flint-knapping experiments were carried out separately by the flint knappers Thorbjørn Pedersen and Greg Nunn. Contrary to many earlier reproduction experiments (cf. Nunn 2005 and 2006; Stafford 1998 and 2003), these did not try to replicate the sublime. On the contrary, the goal was to produce quite ordinary lancet-shaped bifacial flint daggers of Lomborg's type I B, of a size and quality that made them similar to those produced in thousands and distributed over huge areas. The flint knapper had been shown a series of I B daggers from the Hasseris Hill site beforehand.

With the aim of using raw material as close to the original as possible, Senonian flint was procured from a modern chalk quarry situated close to Aalborg. Three flat and oblong nodules were selected weighing 2231, 2655, and 3689 g, respectively. The dimension of the nodule weighing 2655 g was 18 × 17 × 4 cm, whereas the heaviest nodule was a bit longer and thicker and the last one more narrow. During the experiment conducted by Thorbjørn Pedersen a third nodule broke during the removal of the cortex. The outcome of the experiment was two almost finished daggers of subtype I B similar to those found in the dagger hoard at Skolebakken Øst (Becker 1951a, 112; Fig. 6) in addition to a dagger preform *(Fig. 12).* In *table 2* the flint waste is classified in a way similar to that of the waste from Bejsebakken: the almost finished daggers

Fig. 12. Experimentally made daggers and roughout. The dagger and preform to the left was made by Thorbjørn Pedersen. The length of the dagger is 18.2 cm, the width 5.2, and the thickness 1.0. The corresponding measurements for the preform are: 20.5, 7.8, and 1.2 cm. The dagger to the right was made by Greg Nunn. The length is 19.2, the width 3.9, and the thickness 0.9 cm. Photo: Photolab, Moesgård.

produced 200 and 292 flakes respectively, whereas the roughout produced 244. The differences between the two almost finished daggers are due to the fact that Greg Nunn in general made smaller flakes, whereas Thorbjørn Pedersen did the opposite. Most interestingly between 41.4 and 42.5 % of all the flakes had a cortex, whereas the corresponding number among the waste in the small house at Bejsebakken was 31.1 %. This supports the idea that some decortification took place elsewhere. Other observations from the experiment reveal that the bifacial thinning flakes from the almost finished daggers seldomly appeared among the waste – many literally exploded during impact and were therefore classified as splinters. The almost finished dagger and the preform made by Thorbjørn Pedersen represented two and a half hours and one hour and fifteen minutes of work respectively, whereas the dagger made by Greg Nunn took three hours and fifteen minutes.

Comparing these numbers to the number of bifacial thinning flakes from the house A505 and the fact that nodules and final products were rather small-sized *(Tables 1 and 2)*, it can be cautiously estimated that altogether the waste deposited in the fill and the flint concentration represented the production of 8–12 daggers or roughouts.

At this house site, and on Bejsebakken in general, the production of four-sided tools played only a minor role, as indicated by the limited number of flakes ascribed to this category. Furthermore, the waste recorded in this category was made of Senonian flint, in contrast to the fact that the preferred raw material for axes at Bejsebakken, which was Danian flint of the grey

Waste	Dagger (Greg Nunn) Number	Weight (gr)	Dagger (T. Pedersen) Number	Weight	Roughout (T. Pedersen) Number	Weight
Atypical worked int (fragment of preform)	1	47			1	465
Splinters and greatly fragmented akes less than c. 1.5 × 1.5 cm		660		486		92
Bifacial thinning akes – c. size 1–4 cm²	64	127	52	127	38	314
Bifacial thinning akes – c. size larger than 4 cm²	15	137	21	261	22	
Flakes similar to the ones from production of square-sectioned tools	6	35				
Pressure akes		2				
Flakes difficult to classify (fragmented akes, etc.)	125	463	55	263	100	456
Primary and secondary decortification akes	81	680	72	1280	83	1700
Total	292	2151	200	2417	244	3427
End product (dagger / roughout)	1	80	1	117	1	243

Table 2. Classification of waste from the experimental production of two daggers of subtype I B and a preform. Among the waste 41.4, 42.5 and 41.8 % respectively had remnants of cortex.

and coarse type: an examination of all the chisels, axes and adzes found at Bejsebakken confirms this. In total 24 intact or fragmented chisels, axes and adzes datable to the early Late Neolithic were found at Bejsebakken. Most axes were thick-butted with broad-edged blades and rather small-sized (c. 6–14 cm long). On many of them the broad faces were carefully ground, whereas the narrow sides only had partial traces of grinding. Almost 71 % of all the axes were made of Danian flint, 25 % were most likely made of Senonian, and the raw material of one axe could not be determined. These statistics correspond to the general impression given by the flakes from the whole site, where flakes made of the coarse and grey Danian flint occurred fairly rarely. Similar observations have been made on the contemporary material from Myrhøj, where Danian flint seemed to be the preferred raw material for chopping tools and chisels (Jensen 1973, 80). At another and partly contemporary site called Fornæs, situated in eastern Jutland very close to Sangstrup cliff, a similar picture emerges. Even though raw material of Senonian flint was present in vast quantities from the cliff, axes and blanks were mainly made of Danian flint (Apel 2001, 188; Glob 1951, 30). Apparently, the more tenacious Danian flint was preferred for axes and chisels. This convention is probably for practical reasons. Whilst the quality of the Danian flint is far more suitable for chopping tools, high-quality Senonian flint is easier to work and thereby preferable when making bifacial tools.

The flint concentrations in the house were not found in a primary position and the waste from the fill must be interpreted as a secondary filling. For the same reason, the question whether the house depression was actually used as a knapping house or rather it represented a dump site could not be answered with absolute certainty. However, the presence of vast amounts of micro-debitage does indicate that the depression should be interpreted as a knapping site (cf. Clark 1991, 68 ff.; Newcomer 1971, 93; Schiffer 1987, 63). By constructing some kind of shelter the knapper was protected against rain or sun but still had plenty of daylight. Furthermore, a shelter would prolong the working season if we suppose that flint knapping was a seasonal occupation. Thus, the waste in the flint concentration probably represented the cleaning of the hut after the last knapping. Huge concentrations of flint in nearby pits, cultural layers and so forth could represent previous clean-ups. If one accepts the house site as a knapping hut belonging to a local smith it most likely functioned through a longer period – why else spend the time digging a depression and building a house? Refitting the vast quantities of flint from the house and from some of the nearby dump-sites would probably clarify some of the

questions and proposals presented above. However, this is not possible within the framework of this article.

Summing up, the waste in the house offers an up-to-the-minute account and gives an indication of some of the knapping strategies and activities that took place at the site. As indicated by comparing the amount of waste from the experimental production of type I daggers with the waste from the house, 8–12 daggers or roughouts may have been produced, analogous to the work of one person for four to five days at most. However, a more general picture concerning the dagger production at Bejsebakken is requested in order to recognize whether or not this site had any importance in the general organisation of production and trade with other areas. This leads us to the next part.

Dagger production at Bejsebakken

The starting point of this attempt at providing a general view of the production of daggers at Bejsebakken is the investigation of 24 more or less intact daggers of type I and 35 dagger fragments[8] as well as a number of roughouts in all probability produced at Bejsebakken or perhaps at nearby extraction sites. These daggers primarily occurred in the secondary or primary filling of houses, postholes, culture layers, and pits – only a few are without a context *(Fig. 13).*

Most surprisingly, the lengths of the intact daggers varied between 8.2 and 16.3 cm, with an average length of 11.4 cm *(Fig. 14).* This is not very impressive when considering that primary flint was available within a short distance. According to Lomborg only pieces with a minimum length of 13 cm should be considered daggers (Lomborg 1973, 27 f.). Smaller pieces are classified as strike-a-light or miniature daggers (ibid.). Following this classification, which was made due to problems of separating especially type VI daggers from the contemporary dagger-shaped strike-a-light ones, only five daggers from Bejsebakken fulfil this definition. However, Lomborg's classification was made exclusively on daggers from graves and hoards (Lomborg 1973, 168 f.) and as I shall demonstrate below there is a connection between the size and workmanship of the dagger and the context. It is my hypothesis that most people owned small daggers intended for everyday use, whereas large daggers of, for instance, of the I C subtype had a more symbolic role and were not for everybody to own (Sarauw 2007). This idea will be further explored below. By contrast, many of the daggers from Bejsebakken were everyday tools. This is clearly indicated by the re-sharpened blades, traces of use on the hilt[9], and their secondary use as strike-a-light. All daggers from Bejsebakken belonged to Lomborg's type I, which underlines the cultural setting and chronological provenance of the site to LN I. The daggers could be divided into the following subtypes: ten daggers of type I (unknown subtype); three daggers of subtype I A; nine daggers of subtype I B and two daggers of subtype Ix.

The width of the daggers varied between 2.4 and 4.2 cm, with an average of 3.1 cm, whereas the thickness was between 0.7 and 1.5 cm, with an average of one centimetre *(Fig. 14).* One dagger of subtype I A and the hilt of another dagger showed traces of partial grinding *(Fig. 13*). One dagger and two blade fragments showed traces of fine parallel flaking on parts of the blades

[8] These fragments only include separately registered pieces. Some other fragments are probably to be found among the flint waste. Furthermore, a number of bifacial fragments and blanks were excluded due to the difficulties of classifying them – did they for instance represent daggers / sickles, reworked daggers or almost finished daggers / preforms?

[9] Dr. Helle Juel Jensen from Moesgård kindly investigated a couple of the daggers cursorily under a microscope. The dagger seen in the photo, fig. 15, showed traces of being used, but the microwear could not be identified. The same dagger had traces of wood on parts of the hilt showing that a wooden hilt had been placed here. The basis of the hilt was secondarily used as strike-a-light.

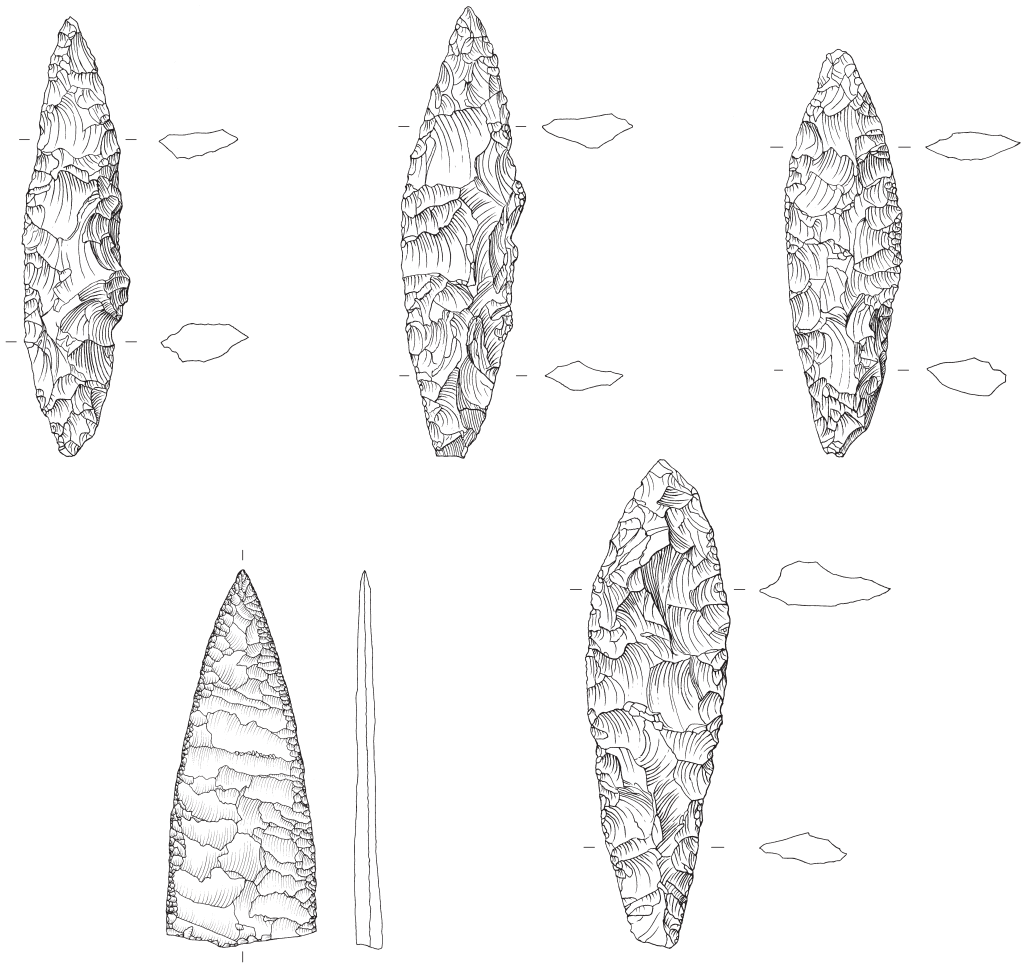

Fig. 13. Example of intact and fragmented daggers from the Bejsebakken settlement. The two daggers at the top left both show that the knapper had difficulties removing part of the surface. The daggers were found together in a pit. The dagger at the top right had partial traces of grinding. The dagger bottom left belongs to the I C subtype. This dagger is drawn by Jeppe B. Jepsen. The others by Louise Hilmar. Scale 1:2.

(Fig. 13). In some cases the pressure flakes ran from edge to edge. These finds illustrate that the flint workers situated at Bejsebakken were aware of the advanced techniques normally used in producing daggers of the I C subtype. Still, the production of such daggers at Bejsebakken was probably not very common. A similar and also limited production is documented at Myrhøj (Apel 2001, 165). However, this general lack of production sites results from the fact that most Danish settlement sites have only been published as preliminary reports in which more detailed analyses of the flint waste are typically excluded.

Among the preforms found at Bejsebakken two types seem to be common: 1 – almond-shaped, very broad and hand axe-like preforms. This type is typically made of flint with a porous white crust, which indicates that the raw material was procured through mining *(Fig. 6*). 2 – oblong and slim preforms of a size that is very close to the final product *(Fig. 15).* This indicates that the reduction sequence would only produce very few flakes. The raw material for the

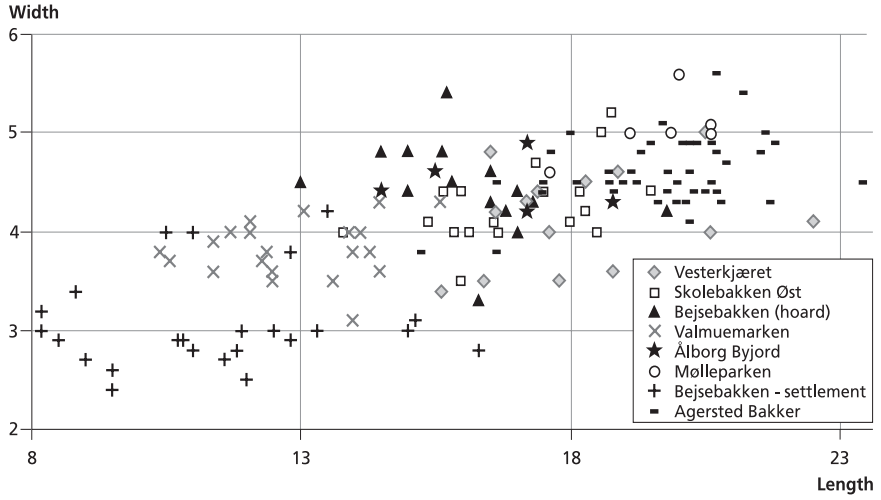

Fig. 14. The length-width relationships of daggers from the Bejsebakken settlement, hoards from the Hasseris Hill, and the hoard from Agersted Bakker. In total 148 daggers.

latter was ‚ad hoc' nodules, i.e. nodules most likely found accidentally in the moraine. However, it should be stressed that the classification of a cortex, especially when eroded, is not without problems (Rudebeck 1998, 325). Only four daggers and four fragments had remains of cortex consisting of porous white chalk, whereas five daggers and two fragments had a weather-worn and grey cortex *(Table 3).* Among 33 discarded dagger preforms from all stages of production, 17 had remnants of a cortex made of white porous chalk, whereas only nine had an abraded cortex. Almost all the blanks as well as both the fragmented and the intact daggers were made of flint similar to that found at the settlement site Bejsebakken. As mentioned above, only one dagger is made of Danian flint and three pieces could not be classified.

Along with the information from house A505 these statistics give some indication that the prehistoric flint workers at Bejsebakken were not very demanding as regards the kind of Senonian flint they used for the production of small daggers. This statement agrees with the observations made by Topping in analysing extraction sites in south-eastern England (Topping 2005, 81). Topping even claims that the need to mine for basic material was unnecessary because flint could be obtained more easily by naturally eroded exposures (ibid.). He further calls attention to the Mesolithic, where people were able to make high-quality large tools apparently without exploiting primary flint resources (ibid., 83). This argumentation could be applicable to Denmark, where high-quality flint is available on many shorelines due to erosion, such as parts of Djursland, eastern Jutland or the chalk cliffs of Stevns and Møn (cf. Glob 1951, 25; Hansen and Madsen 1983, 57). Hansen and Madsen come to a similar conclusion but also point out that the mines were the result of the fact that people wanted the best quality of flint regardless of the size of the nodules, since this was a precondition for a good result with regard to the production of daggers (ibid.). Furthermore, flint of a quality similar to that extracted from the mines could perhaps not be found within such a short distance from Bejsebakken.

In connection with the excavations of a large Neolithic extraction site in Kvarnby – Södra Sallerup in south-western Scania, four test pits were dug into the chalk. They revealed that nodule size on average is quite modest and that nodules were furthermore quite unequally distributed in the chalk (Rudebeck 1998, 323). As mentioned above, this situation is quite similar to that of Skovbakken in northern Jutland. The number of nodules of good quality per

Fig. 15. Dagger preforms from Bejsebakken in different stages of reduction and a finished dagger, 12.8 cm long and 2.8 cm wide. M. 1 : 2. Photo: Photolab, Moesgård.

cubic meter of chalk at Sallerup varied between 10 and 106 (ibid.). If 15 cm was considered to be acceptable as the absolute minimum length, only 10–15 % of the nodules were useable. Even if these statistics cannot be transferred directly to the Jutlandic conditions, they provide some indication of the effort put into the extraction at the mines in order to uncover the relatively few usable large-size nodules of a high quality.

The main conclusion to be drawn from this section is that many of the daggers produced at Bejsebakken were rather small and that both erratic and mined flint was used. As indicated by some of the dagger fragments, one cannot exclude that larger daggers were also produced, but these were presumably eventually removed from the site and ended up in other contexts such as graves. Broadening the area of investigation and including all the type I daggers found in hoards on the Hasseris Hill may add information to these preliminary conclusions.

Dagger hoards from Hasseris Hill – gifts to the gods or commodities of exchange?

Within a short distance of Bejsebakken towards the north and east and within a maximum radius of 1.7 km were six hoards containing a total of 86 bifacial flint daggers and one flint sickle. This underlines the special character of this small area *(Fig. 9).* However, why do the dagger hoards cluster to such an extreme extent in this area and what is the meaning of these and other dagger hoards? Furthermore, what information on production might the daggers in the hoards reveal? Can they, for instance, tell us anything about the craftsmanship of the daggers, the sizes, raw material and so forth? And were the daggers in the single hoards manufactured by the same or several different craftsmen?

The distribution of daggers with regard to types and numbers is shown in the catalogue. As seen from this, most of the daggers from Hasseris Hill belong to Lomborg's subtype I B (62 %), whereas 25 %, all situated within the same hoard, could be ascribed to subtype Ix. Only two pieces, also from the same hoard (Vesterkjæret), belonged to the desirable I C subtype. On

Type	Type of cortex		Total
	Porous white chalck	Grey and abraded	
Daggers	4 (17 %)		24
Fragments of daggers	4 (11.4 %)		35
Roughouts	17 (51.5 %)	9 (27.3 %)	33
Total	25 (27.2 %)	9 (9.8 %)	92

Table 3. Distribution of type of cortex on daggers, fragments and roughouts from Bejsebakken.

both pieces traces of grinding could be observed. Several daggers within this particular hoard had a parallel-like flaking.

All daggers in the hoards seem to have been made of Senonian flint. Among the 15 daggers preserved from Vesterkjæret, eight had remnants of porous soft cortex, whereas one had an abraded cortex. In eight cases the cortex remains were situated at the lower end of the hilt – in one case a small piece of cortex was placed at the point. Rudebeck has recently suggested that cortex especially on point-butted axes was left intentionally as a sign of not only the quality and the source – the flint mines in Kvarnby, Södra Sallerup in Scania – but also „as a sign of the special value attributed to the act of extracting flint for the celebration of social transformations" (Rudebeck 1998, 325 ff.). As regards the daggers, more practical considerations were most likely the reason for the presence of a cortex. The flint knapper wanted to exploit as much as possible of the nodule in order to create the longest possible dagger. Anyhow, the hilt was most likely wrapped in leather or made of wood, as we know from the find from Wiepenkathen (Cassau 1935), thereby hiding a possible cortex. Corresponding observations of exploitation of the nodules in an optimal way can be made on many daggers. For instance, two unfinished daggers in the hoard from Valmuemarken with a porous cortex in both ends showed that the length of the nodules used as raw material was only 13.6 and 10.6 cm respectively. In total, 22 daggers from the hoards at Hasseris Hill had remains of a soft white cortex, typically placed as described above. Another 20 had remains of an abraded cortex. However, it should be stressed that in some cases it was difficult to classify the small remains of cortex and that these statistics should therefore be taken with some reservation.

Investigating further into sizes, raw materials, and the craftsmanship of the daggers, a very high degree of agreement within the single hoards could be observed. For instance, the 21 daggers from Valmuemarken, all of Lomborg's subtype Ix, were all relatively short, narrow and thick with an average length of only 12.9 cm and an average width of 3.8 cm *(Figs. 14, 16).* Besides, the raw material used for many of the daggers in this hoard seems to be ad hoc pieces. For instance, four daggers were made of nodules with an abraded and ‚dirty' cortex. The same daggers had smaller or larger areas covered by a white un-worked patina, indicating that the flint had at some point been exposed – and also that the raw material for these four daggers was collected in the same area. Moreover, many of the daggers in this hoard were asymmetrical in a uniform manner *(Fig. 17)*. This shows that the same mediocre knapper made all the daggers in this hoard.

Correspondingly, when compared to each other the daggers in the hoard from Vesterkjæret display remarkable similarities, especially with regard to the presence of a soft cortex as described above but also in the superb workmanship visible in most of the daggers *(Figs. 14, 16)* with their symmetrical shape and the straight seams. Moreover, most daggers are relatively long and slim with an average length of 18.2 cm and an average width of 4.2 cm.

Another example of this uniformity is the 15 daggers in the hoard from Bejsebakken. These daggers are mostly broad and short – the average length is 16.1 cm, whereas the average

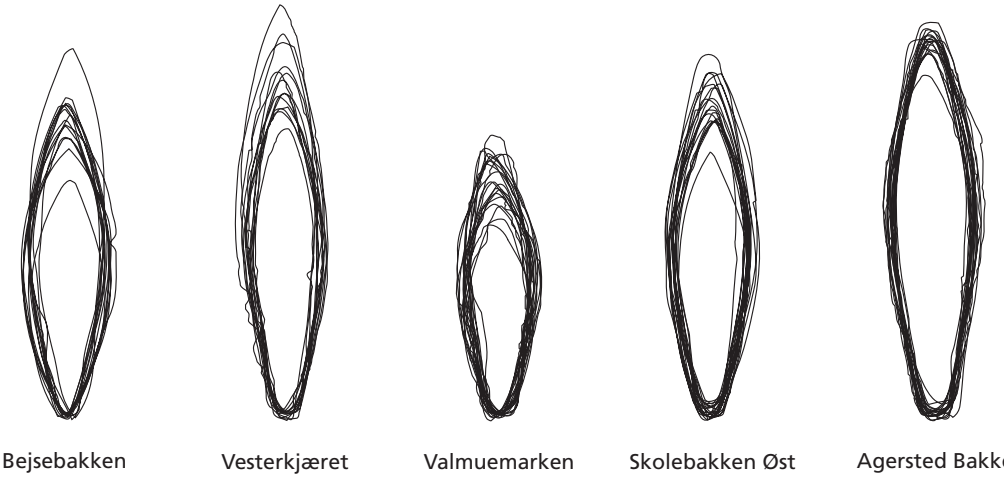

Fig. 16. Outline drawing of a selection of hoards illustrating the similarities among the daggers within the single hoards. Scale 1 : 4.

width is 4.4 cm *(Figs. 14, 16)*. Furthermore, these daggers, seven of which had a soft porous cortex, were all ordinarily or poorly made. On five of them, at the lower part of the hilt, a specific fracture reveals that the same flint smith made all of them. In general, the majority of the daggers in the hoards found on Hasseris Hill appear to be unused and unfinished, lacking the last refinement.

The uniformity of shapes within each hoard does not only apply to daggers from Hasseris Hill. For instance, the 46 daggers from Agersted Bakker in Vendsyssel c. 34 km to the north-east of the Hasseris Hill – and representing the largest concentration of type I daggers found in Denmark or anywhere – were all well-made and so uniform in shape that the same template appears to have been used to make the daggers. Forty-four measurable daggers are all broad and long – almost almond-shaped with an average length of 19.5 cm *(Figs. 14, 16).* On some the hilts are faintly thickened and a bit skewed. On others the points are blunt, in some cases due to the presence of a cortex indicating the lack of the last finish. An abraded cortex could be observed on 26 daggers, whereas six had a soft porous cortex. Only one dagger stood out as differently shaped. Whereas most of the daggers seemed unused, the latter dagger was heavily reworked and looked almost like a spearhead, even though this function may be questioned (Sarauw 2007).

More examples stressing that the uniformity within each single hoard is not accidental could be added. On the contrary, the daggers deposited in the larger dagger hoards in the Limfjord area were most likely made by the same flint smith, or perhaps by an affiliated person belonging to the same tradition. It is likely that the six hoards described above represent the work of six different persons.

Each craftsman had particular preferences with regard to the shape of the daggers, or he or she might even have had a ‚model' that was reproduced. A craftsperson's mark was of course not only the style of knapping but also the limitations of his or her skills. Such limitations resulted in the repetition of the same failures on a number of daggers. Besides, as in some of the cases already mentioned, the final products could be uniformly though poorly made daggers. Corresponding observations showing that the same flint smith was the maker of every dagger in a hoard have been made on other occasions – for instance, on a type III dagger hoard with 16 unused daggers found at Hårbølle bog near Møn's Cliff (Olausson 1997, 274, 2000, 130).

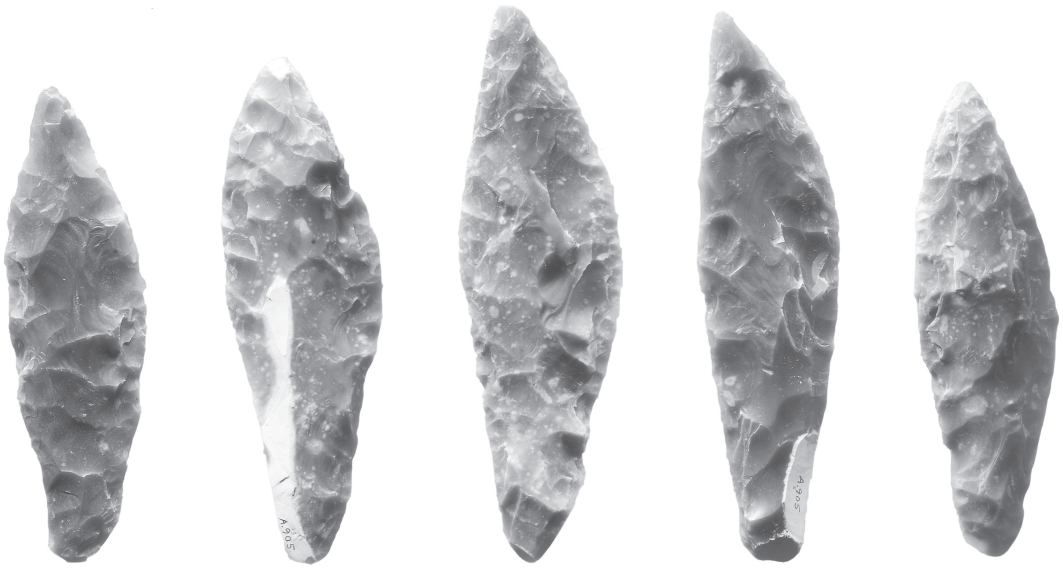

Fig. 17. Examples of daggers from Valmuemarken. Notice the similar shapes of the daggers. The lengths of these daggers vary from 12.5 to 14.6 cm and the widths from 3.5 to 4.2 cm. Photo: Photolab, Moesgård.

As regards the interpretation of the dagger hoards, no simple or clear picture emerges. By contrast, the hoards constitute a fairly complex group of finds with regard to both composition and the context of deposition (see catalogue). This complexity is confirmed if we compare them with other single-type hoards of, for instance, metal axes, flint axes and flint sickles.

The dagger hoards can roughly be divided into the following three categories: single-type hoards containing three or more daggers; multi-type hoards containing at least three different types of artefacts; and double-type hoards containing daggers in combination with another type *(Fig. 18).* Even though a hoard may be defined as two or more objects deposited together at the same time (cf. Ebbesen 1981b, 94; Karsten 1994, 19), I have chosen this alternative division to avoid the large bulk of single-hoards and hoards containing only two items. We thereby get a more distinct picture of the nature and distribution of the larger dagger hoards, which is my main concern[10]. Single-type hoards predominate at 56 %, and they include between 3 and 46 daggers. On the average, 12.4 daggers occurred in each hoard. Most of the large dagger hoards are concentrated around the Limfjord and are somehow connected to a wetland environment *(Table 4, Fig. 18).* Fifteen were reported as being found in former bogs and seven on dry land; in three cases the find context is unknown. Multi-type and double-type hoards each correspond to 20 and 24 % of the hoards. Among the double-type hoards the combination dagger and flint sickle occurred four times, whereas daggers and axes and daggers and a pendant each occurred once. Besides daggers, the multi-type hoards typically include axes, sickles and chisels. Nevertheless, one of the multi-type hoards, the wetland find from Dyskov, situated approximately 15 km north-east of Hasseris Hill, differed from the others. Apart from 26 daggers, two axes and a retouched flake, the hoard contained material from the production of type I-daggers in the shape of two dagger preforms and nine flakes, some of which were bifacial thinning flakes.

[10] For the same reason, the catalogue only includes hoards containing three or more items, one of which is a dagger of subtype I. Daggers of subtype I D are not included because they, together with type II daggers, belong to another production area situated on the islands of south-eastern Denmark (Lomborg 1973, 41 f; Madsen 1978; Rasmussen 1990, 38).

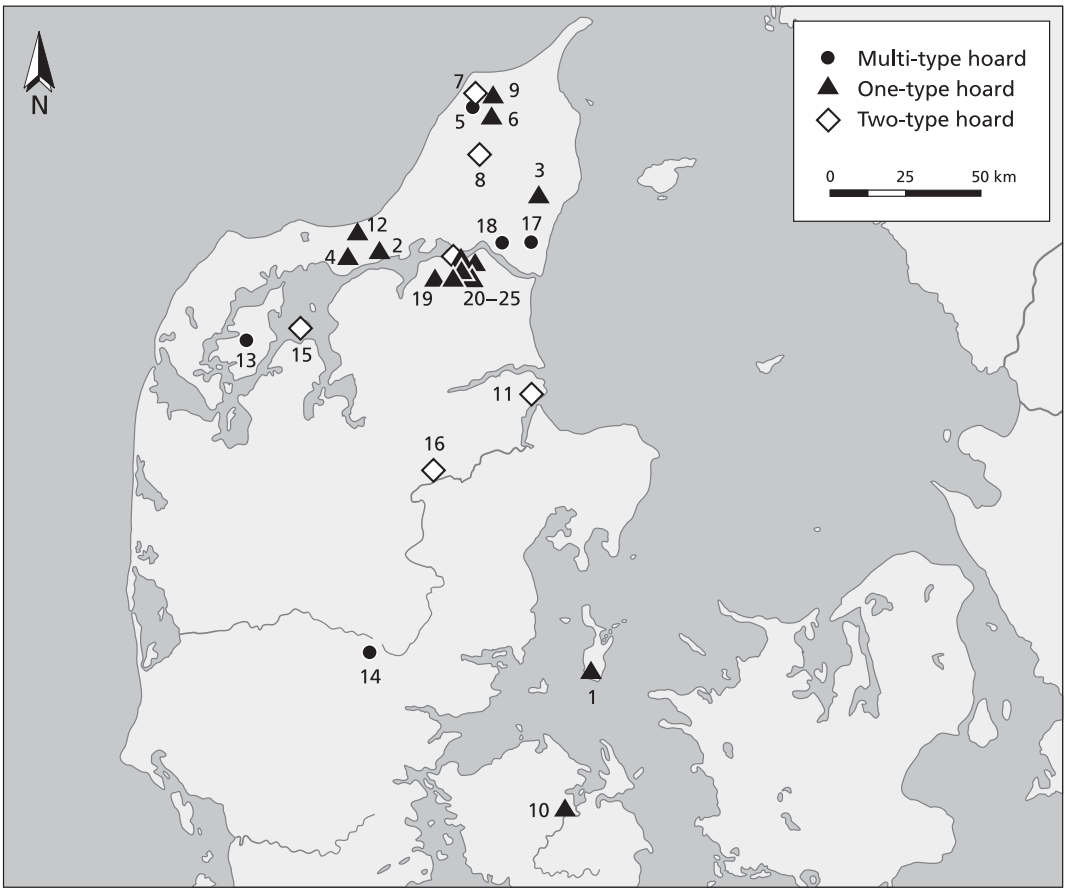

Fig. 18. Distribution of dagger of type I hoards (subtype I D excluded). The numbers refer to the catalogue.

Furthermore, the daggers in this hoard differ from the daggers in other dagger hoards in their different sizes and types, including a dagger of the IC subtype.

The wetland depositions described above are in accordance with similar and repetitive deposits of the preceding periods (cf. Bradley 1990, 2000; Ebbesen 1983, 2006, 135ff.; Karsten 1994; Nielsen 1977, 1979). Thus, they represent a rather universal practice most likely illustrating a continuation of certain religious beliefs (cf. Hansen 1994, 371 ff.; Levy 1982, 17 ff.). The offerings should probably be seen as gifts to the supernatural world or gods in order to achieve certain goals on behalf of the individual or the community (cf. Johansen 1993, 126 ff.; Levy 1982, 20 ff.; Vandkilde 1996, 275). Such goals could be rather basic for the individual or for the family-group and they might concern fertility, thanksgiving, a good harvest (cf. Ebbesen 1981a, 1986; Koch 1998, 164 ff.) and so on, or they could reflect certain religious and social traditions in society. This diversity is reflected in the variety of new and unused flint tools and probably also by other items sacrificed but seldom discovered such as animals or even human beings (Bennike / Ebbesen 1987; Karsten 1994, 100; Skaarup 1985, 395).

Many of the dryland hoards deposited at Hasseris Hill should perhaps be interpreted in a similar way, but clearly these hoards also refer to the extraction sites as well as to the barter and exchange of daggers. This point of view is illustrated by the uniformity of the hoards and by the

Type of hoards	Total	Wetland	Dryland	Unknown
Single-type hoards	56 % (14)	28 % (7)	28 % (7)	
Multi-type hoards	20 % (5)	12 % (3)		8 % (2)
Two-type hoards	24 % (6)	20 % (5)		4 % (1)
Total	100 % (25)	60 % (15)	28 % (7)	12 % (3)

Table 4. Distribution of 25 hoards from three different types of hoards and from different environments. The actual number is shown in brackets.

fact that they cluster to an extreme extent in the mining area and almost encircle it. Especially one of the hoards, Skolebakken Øst, which was found at or near the bottom of an old shaft, further illustrates this viewpoint (Becker 1951a, 112, Fig. 6). Extraction sites, as well as the flint from a certain source, may very well have possessed some kind of special significance (cf. Bradley 2000, 41, 81 ff.). Furthermore, as pointed out above, these dagger hoards arguably relate to exchange of commodities, especially with Norway. The internal uniformity of the single-type dagger hoards tallies well with our interpretation of the daggers as standard commodities that were to be shipped off towards Norway or exchanged to other parts of Jutland and the Danish Islands (cf. Vandkilde 2000, 32 ff.; 2005b, 389). Thus, one could say that two different kinds of exchange took place: one directed toward other human beings and another of a more symbolic character made up by the dagger hoards and directed toward the goods. The latter only included a small part of what was actually being produced and shipped away.

That many kinds of activities relating to cult and religion actually took place at the extraction sites are indirectly implied by ethnographic analogies (Arnold 1984, 45; Bradley 2000, Topping 2005). Furthermore, in reviewing some of the English material, Topping has shown that different kinds of ritualised behaviour such as cleansing ceremonies, offerings, rites of renewal and so forth actually took place at the mining sites (Topping 2005). Such ritual behaviour could be seen in the archaeological record by the presence of hearths at the base of shafts, animal or human remains, graffiti, artefacts in structured deposits, broken axes and so on (ibid.). As mentioned above, bones from a cow and a suckling pig, a fragment of a human skull, and fireplaces were present in the fillings of some of the mining shafts (Becker 1951b, 147; Grantzau 1954, 37 ff.). However, the excavators considered such findings more or less accidental (ibid.).

The above interpretation disagrees in part with the interpretations of previous archaeological research, where the dagger hoards are argued to be hidden stocks of goods incorporated in a commercial enterprise (cf. Becker 1993, 122; Brøndsted 1957, 333; Mathiassen 1934, 22). These previous interpretations further imply that Late Neolithic society was very warlike – why else hide stocks of wealth? Furthermore, following these interpretations rigidly, a consequence must have been that especially Hasseris Hill was attacked or raided several times, with the result that the ones who knew where to collect the daggers had been killed since otherwise the daggers would have been retrieved later on (see also Karsten 1994, 30 and Johansen 1993, 109 ff.). Even though some evidence indicates the presence of warriors (Sarauw 2007), and thereby the possibility of small scale war or raiding, no further evidence supports such hypotheses. Besides, the mining or the flint resources must have been difficult to monopolise because of the general abundance of flint along the shore lines and in the moraine. Therefore, it is hard to see the flint resources as the reason for any conflict unless people from areas with no or bad flint resources were involved. Finally the many ‚un-collected' dagger hoards concentrated on Hasseris Hill – a rather small area – statistically speak against the hidden-stock theory.

If we accept the analyses presented above as a clear indication that the same flint smith made most of the daggers within a single hoard, it also implies that many of the daggers were

in all probability unused. This agrees with the observation made on a number of hoards from Hasseris Hill and elsewhere, where a number of daggers clearly lack the last finish[11]. A systematic investigation searching for microwear could confirm or deny this supposition. However, in other cases an old dagger or sickle accompanied a deposit of unused daggers. Such examples stress the necessity of applying a complex interpretation and show us the danger of making generalisations. They suggest that the items were carefully selected and added something very personal, or that the deposits were sometimes of a more random character. They furthermore imply that either the flint smith made the offering or that someone else did – someone who had obtained a number of daggers from the same flint smith with the intention of making a sacrifice. In such cases the daggers were perhaps made with the purpose of being offered. Such observations have been made regarding Late Neolithic broad-edged axes and spoon-shaped scrapers in Scania (Karsten 1994, 183). Moreover, Olausson interprets some of the dagger hoards as representing considerable investment of time and as the work of attached specialists under the protection of aggrandizers who aimed at demonstrating and gaining social power (Olausson 2000, 127 ff.).

However, and in contrast to, for instance, the Early Neolithic axe hoards, which often contained the finest and largest axes a flint smith could produce (Nielsen 1977), the Late Neolithic type I dagger hoards contained more ordinary daggers. At this time, and as further documented in the next section, the most sublime product of the flint smith, the type I C daggers, is clearly related to the burial sphere and thereby most likely connected to individual persons (Lomborg 1973, 40; Rasmussen 1990, 35; Vandkilde 2000, 37).

[11] A dagger from Skolebakken Øst was inspected for microwear by Helle Juel Jensen, Moesgård. The blade on this dagger had apparently never been used, which was shown by the traces of flint dust.

Social interpretation of the context of flint daggers

The importance of the context of material culture has long been known as one of the key issues when interpreting material culture (cf. Vandkilde 2000). We might say that the context gives meaning and opens up for further social interpretation regardless whether it concerns, for instance, specific questions of deposition or the affiliation of a certain artefact within a broader cultural historical framework. Contextual information, then, provides us with the possibility of gaining access to or recognising and understanding more complex topics of the past such as religion or other cognitive aspects of society. However, if the context of an object is „the totality of the relevant dimensions of variation around any one object" (Hodder 1986, 143), the definition of context is entirely an interpretive decision connected to the sort of problems we are trying to solve (Shanks and Tilley 1992, xix [1987]).

The following analysis investigates whether the physical appearance and symbolic meaning of daggers are dependent on the context of deposition and what this contextual information then means. Is, for instance, the same symbolic meaning attached to all kinds of daggers, and is the meaning the same in both the area of production and the area of receipt?

This investigation is primarily based on measurements and contextual information obtained from 546 type I daggers and their find circumstances. The daggers belong to three different contexts: graves, settlements and hoards. The daggers attributed to settlements were all found at Bejsebakken, and along with the hoards they have been investigated above.

Grave finds comprising a total of 281 daggers from Jutland fall into two groups: daggers from ‚archery' graves and daggers from ordinary graves. In the first group, 51 daggers occur combined with arrowheads and presumably other archery gear (Sarauw 2007). These graves are primarily situated in the area around the Limfjord, although a few have a more southern distribution. The second group is represented by available daggers recorded in the museum collections as having been found in graves in the ‚old' counties of Aalborg, Viborg and Skanderborg[12]. These different counties were selected in order to see if a connection could be demonstrated between the size and quality of single daggers and the distance to the putative production areas. This information will not, however, be included until the last part of this paper.

As seen from figure 19, which is based on 510 daggers, there is a clear connection between the context of the dagger and its size. Daggers from the Bejsebakken settlement are all short and narrow, their average length being 11.4 cm. Most daggers found at other contemporary early Late Neolithic settlements are broken, so reference material is almost non-existent (see, for instance, Boas 1991 and 1993; Earle 1997, 126; Jensen 1973; Simonsen 1983; Skov 1982). However, a few settlement finds, i.e. Diverhøj on Djursland and Øster Nibstrup in Vendsyssel, provided daggers as small as those from Bejsebakken. A dagger of subtype I B found in two pieces at Diverhøj was only 13.3 cm long and 2.7 cm wide (Asingh 1988, 149). Another type I dagger from the same site, but from a different context – a burial – measured 18 × 3.2 cm (ibid., 142). At the Øster Nibstrup settlement two daggers of subtype I B were found in post holes

[12] The catalogue in Lomborg 1973 was used as a starting point. The ‚old' Danish counties and parishes can be seen in Ørsnes / Voss 1985.

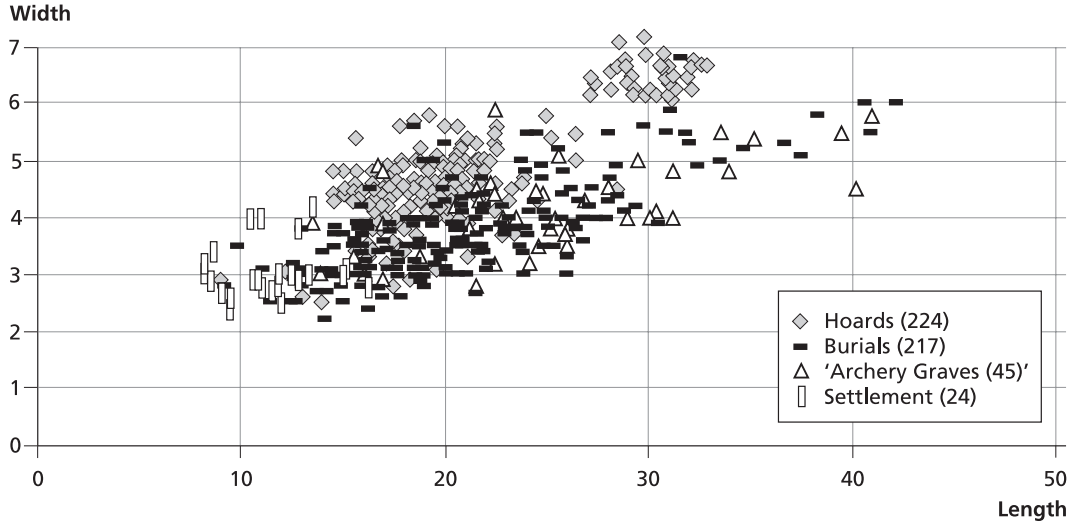

Fig. 19. The length-width relationships of type I daggers from different contexts: the Bejsebakken settlement, hoards, and graves. In total 510 daggers.

belonging to a two-aisled house, implying some kind of ritual deposit (Michaelsen 1989, 82). They measured approximately 13.2 × 3.5 and 11.3 × 2.6 cm respectively, and they stress the functionality of small daggers as compared to daggers of extreme size. Another example of this is the small bifacial flint dagger with a crude wooden handle found with the Iceman and dated to about 3350–3100 BC (Egg et al. 1993, 58). The knife had been used for the butchering of animals, as suggested by traces of blood and animal fibres (Loy 1998). Surely this dagger did not serve as a prestige weapon connected to a male warlike sphere but was strictly functional. We should see the small daggers from Bejsebakken and perhaps other production areas in a similar way. Such daggers were probably made as commodities for export and used at the same time as the daggers of extreme sizes intended for other purposes, which were most likely reserved for a group of adult males (cf. Earle 2004, 118). However, with regard to areas without primary flint resources such as Norway small daggers might have held enormous symbolic importance (cf. Højlund 1979 for an ethnographic analogy).

The relationship between context and dagger subtypes is shown in table 5. Due to the rather small number of daggers found at the Bejsebakken settlement, these are not included in the statistics. The hoards are clearly dominated by subtype I B, which constitutes almost 76 %, followed by subtype I A. Among archery graves, 41 % belong to the technologically advanced, parallel-flaked dagger of Lomborg's I C subtype. This type also occurs frequently in other graves (18.8 %), whereas it is almost non-existent in the hoards (2.5 %). Regarding ordinary graves and archery graves it is of further interest to see that daggers of subtype Ix, i.e. daggers characterised by being re-sharpened or reworked in other ways (Lomborg 1973, 44) constitute such a large part (37.5 and 19.6 % respectively). This indicates that in many cases people were buried alongside rather used daggers – probably the dagger they normally carried and used on a daily basis when they were still alive (see Stenskold 2004, 253 ff. for another view on the re-sharpening of daggers). This should be contrasted with the custom of burying the deceased with oversized and in many cases unused daggers of the I C subtype, which can be as long as 42 cm and as broad as 6 cm. In comparison, 59 daggers of the I C subtype had an average length of 28.3 cm, whereas the corresponding length of 87 daggers of subtype Ix was 17.6 cm.

	Archery graves		Hoards		Other graves		Total	
Dagger types	Number	Percent	Number	Percent	Number	Percent	Number	Percent
I A	4	7.8	24	11.9	10	4.3	38	7.9
I B	12	23.5	154	76.2	55	24	221	45.9
I A/B	3	5.9	8	4	32	14	43	8.9
I C	21	41.2	5	2.5	43	18.8	69	14.3
I E	1	2	1	0.5	3	1.3	5	1
Ix	10	19.6	10	5	86	37.5	106	22
Total	**51**	**100**	**202**	**100.1**	**229**	**99.9**	**482**	**100**

Table 5. Distribution on subtypes of 482 daggers from hoards, graves, and archery graves (data from Lomborg 1973).

This diversity among daggers situated in the same context and in the same geographical areas may indicate that social differences existed. A similar materiel hierarchy among daggers found in megalithic tombs was noticed by Weiler in her work on Västergötland in south-western Sweden (1994, 76).

Even if one resided in the area around the Limfjord where high-quality flint was present in relatively abundant quantities, one was not guaranteed ownership of a dagger of supreme quality and size. This is revealed by the fact that only 9 % of all Danish daggers of type I[13] could be ascribed to the I C subtype.

Although the differences between daggers deposited in hoards have been documented above it is valid to characterise them as a homogenous group from a more superficial point of view. They are relatively short and broad with an average length of 18.1 cm and an average width of 4.3 *(Fig. 19)*. The corresponding numbers concerning the daggers found in graves are 20.6 and 3.7 cm. Daggers found in archery graves are on average 24.8 cm long and 4.2 cm wide. How should these differences regarding the length and width of the daggers found in graves and hoards be interpreted? Apel has documented that Swedish daggers loose quite some width but not much length during re-sharpening (Apel 2001, 310 ff.). The bulk of Danish daggers located in single-type hoards may, regardless of a profane or sacral interpretation, be seen as unused and in some cases unfinished daggers. By contrast, the narrowness of the vast majority of daggers found in graves, especially of subtype Ix, can be seen as the result of heavy use followed by re-sharpening of the daggers. This point of view is confirmed when comparing the daggers from hoards with the 87 daggers of subtype Ix from graves *(Fig. 20)*. Daggers of subtype Ix found in graves are on average 0.5 cm shorter and 1.1 cm narrower than daggers found in hoards. These numbers illustrate the average of material that was removed by re-sharpening[14].

Another obvious difference between daggers found in hoards and graves is the frequency of a cortex. Among 271 daggers found in graves, archery graves included, about 36 % had remains of a cortex. An almost similar frequency is represented by the daggers found at the Bejsebakken settlement. However, of the 240 daggers found in hoards 57 % had a cortex. Why is this difference so marked and attached to the context? Is it because daggers of type I from hoards are not as carefully made as daggers from graves, perhaps because they were to be deposited anyway when made or used for exchange? As mentioned above, daggers placed in hoards often lack the finishing touches.

Similar observations have been made on axe hoards from the late Single Grave Culture and the Late Neolithic. They often included quite a few unfinished axes and blanks and were

[13] Subtype I D excluded.

[14] Working on the length of the Swedish shaft-hole axes from the Late Neolithic, Lekberg, notice a similar difference in size and context (Lekberg 2000, 160 and 2002, 172 ff.).

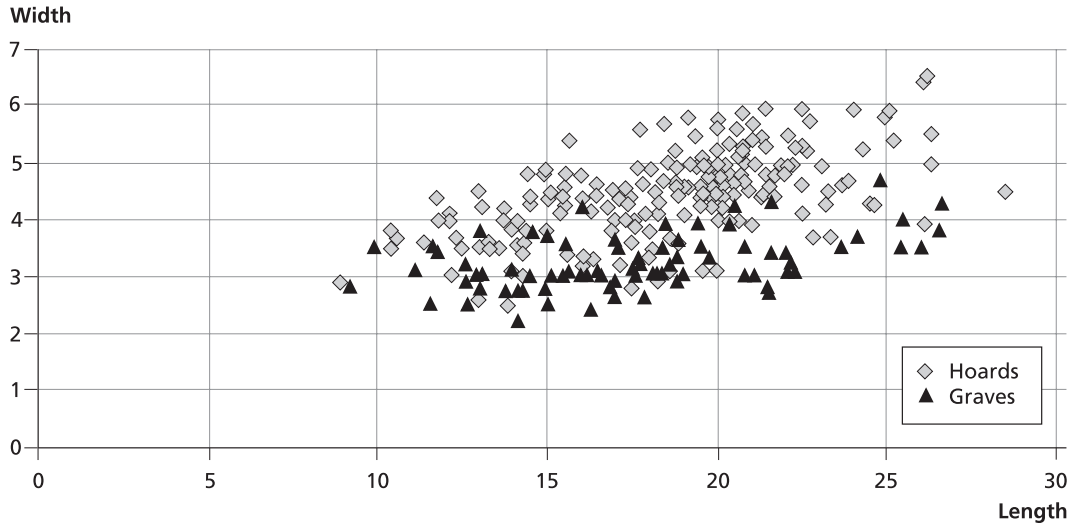

Fig. 20. Length and width relationships of 87 daggers of Ix subtype found in graves and 224 daggers of type I (mostly subtype I B – cf. table 5) found in hoards.

distributed all over South Scandinavia (cf. Becker 1953; Ebbesen 1981b). Nevertheless, in other periods of the Neolithic only the finest items were deposited (Nielsen 1977), and the same is true for the type III dagger hoard from Hårbølle. In this respect the early Late Neolithic of northern Jutland deviates: the most sophisticated daggers a flint smith could produce, the parallel-flaked daggers of the I C subtype, were primarily attached to the grave context. Daggers of supreme size and quality were related to individual persons and / or to the mourners' representation of certain deceased persons. It further underlines the symbolic values attached to these daggers relating to high-ranking maleness or warriorhood (Sarauw 2007; Vandkilde 2000, 39). Such values are in accordance with trends in vast areas of Europe, as illustrated by Bell Beaker burials in England or Holland, which also contained different kinds of daggers, or as shown by rock carvings and the statue-menhirs of France and northern Italy (cf. Barfield and Chippindale 1997, 120; Fitzpatrick, 2002; Drenth and Hogestijn 2001). This uniformity in dagger symbolism on a European scale may have reached Jutland through a wide-reaching exchange network (Vandkilde 2001, 337 and 2005a, 17).

Aiming at a conclusion, the analysis presented above showed that in most cases the context of the dagger was connected to the size and the craftsmanship of the dagger. The extremes were the small daggers found at the Bejsebakken settlement and the daggers found in archery graves. These differences implied that different kinds of conventions might have existed determining the utilization of different kinds of daggers. However, we remain uncertain about how the production was organised and whether every flint knapper was capable of making the different kinds of daggers.

The question of skill and social complexity

The question of craft specialisation in the early Late Neolithic society is certainly relevant, since it is intimately interconnected with and even instrumental in the development of social inequality (cf. Brumfiel and Earle 1987; Clark and Parry 1990, 290; Earle 1987, Hayden 1995, 21; Peregrine 1991). It is generally assumed that complex societies have more complex ways of dividing labour beyond gender and age. Hence, the diversity, number and types of craft specialisations correspond to the complexity of society. Furthermore, the general production in craft-specialised societies exceeds the needs of the household (Shafer and Hester 1991, 79).

Following Clark and Parry, craft specialisation can be defined as the „production of alienable, durable goods for nondependent consumption" and always involves the transfer of goods (1990, 297). Thus, the consumer is not a member of the producer's household. According to Arnold, the term ‚specialist' refers to those people who perform complicated tasks more successfully than others due to their access to information, experience and so forth (Arnold 1984, 38). This implies that a specialist worker is drawn away from full-time subsistence-directed activities on a full or part-time basis.

Whether we prefer one definition over another, the controversial issue regarding the Danish Late Neolithic is whether full-time craft specialists were present or not. A full-time craft specialist could be seen as a person who makes a living of repeatedly manufacturing a craft product that is standardised to a certain degree. A part-time specialist is, as the term implies, a person for whom other activities constitute the primary income (Clark and Parry 1990, 298). Craft specialisation in society is present when there is a standardisation of production (Torrence 1986, 45ff.). The presence of time-demanding and rare objects that demanded high-level skills of the craftsperson is often linked with the presence of ranked societies and social complexity (cf. Olausson 1997, 270; Brumfiel and Earle 1987, 5). Furthermore, dealing with craft specialisation, the terms ‚attached' and ‚independent' specialists are of utmost importance with regard to the level of social complexity (Olausson 1992, 2). An independent specialist withholds the rights to his product, whereas an attached specialist is sponsored by a patron or an aggrandizer who controls the rights to the product (ibid., Clark and Parry 1990, 298; Brumfiel and Earle 1987, 5).

In her analysis of the production of daggers and axes in the South Scandinavian Neolithic, Olausson has worked intensively on the organisation of production in relation to the development of social stratification (Olausson 1992, 1997 and 2000). Following Costin, she presents a model involving four different levels of production (Olausson 2000; Costin 1991). However, only the first three production forms included in this model are of relevance when aiming at interpreting the organisation of flint dagger production. The first and most simple organisational production form – household production – occurs at home when an individual or a group produce what is needed (Olausson 2000, 123). In the second production form – household industry – the production is larger than what is needed in the household and the surplus is used for exchange and trade. The production is not full-time but occurs in short intensive periods. In the last model – attached specialist production – a craft specialist works full-time, which implies

that a patron or an aggrandizer sponsors the work (Olausson 1992, 2 and 2000, 123 f.). The first two production forms are characterised by low-level skills and a short manufacturing time, whereas the last one requires high-level skills and a long production time. The work done by the attached specialist resulted in exclusive and exceptional items. The presence of such prestige technology is seen as a means for an elite to gain social control (Olausson 1997, 276).

According to Olausson, who among other things based her conclusions on an examination of the craftsmanlike quality of 600 Swedish daggers, all three models are present in the Late Neolithic (Olausson 2000, 128). However, as Olausson states, such diversity among large samples of daggers might not necessarily imply the presence of different ways of organising production. Such a sample may rather illustrate different craftsmanlike levels in production – i.e. masters were once beginners, most likely producing daggers of poor or ordinary quality. According to Olausson, the last and most developed model is implied by some of the dagger hoards. Furthermore, Olausson argues that patron support of specialist knappers served as the foundation for the chiefdoms in the later Bronze Age (Olausson 1997, 276).

Another detailed analysis concerning the practical know-how and theoretical knowledge needed in the production of daggers is provided by Apel and based on the experimental production of in particular the prestigious type-IV daggers of LN II (Apel 2000, 145 ff.; 2001, 34 ff.; 2004). Following Callahan, the production of such daggers is divided into seven stages and each stage seems more or less to be dependent on the degree of know-how and knowledge of the knapper (Apel 2001, 34 ff.; Callahan 1979). Thus, the last stages and especially the fifth required a master or a very skilled person. Apel suggests that the last stages were performed by journeymen or masters, whereas the other stages could have been performed by apprentices (Apel 2000, 148f). In conclusion, and due to the practical and theoretical know-how connected with the production of the prestigious daggers, Apel assumes that an institutionalised apprenticeship system was a precondition for such production (Apel 2000, 150).

According to Apel, the technology was most likely transmitted vertically within lineage groups or clans, allowing the apprentice to start at an early age (Apel 2001, 329 ff.). Due to this institutionalised system, Apel argues that the social structure was based on ranked and segmented common-descent groups upheld by male elders (2004, 306). These male elders, or chiefs, also exercised control over the most fertile land and controlled the exchange networks into which prestige items such as daggers and metal objects entered (ibid.).

That one cannot always equate the existence of time-demanding prestigious weapons or impressive extraction techniques with the presence of full-time specialists is shown by analogies to the tribal societies of Highland New Guinea (Torrence 1986, 57). Here the production of stone axes for work, ceremonial practice or as bride-price payments was undertaken by most men living near the source (Vial 1940, 160). The extraction was unspecialised, even though from an archaeological point of view the shafts with a depth of as much as ten metres could seem to be the work of specialists. Some axes entered into exchange networks in order to provide the owner with other commodities. Other axes were used in the complicated socio-economic system as bride-price, compensation payment after a killing, or as ceremonial exchange items and the like (cf. Burton 1984; Hughes 1977; Højlund 1979; Strathern 1969).

The preforms were chipped out at the quarry and this work took from half an hour to one day depending on the skill and the luck of the knapper (Vial 1940, 160). A first-class ceremonial axe including the carving and decoration could be made in a week. All men living close to the extraction sites were capable of making such axes.

Another example, but one that is somehow contradictory to the evidence from New Guinea, is ethnographic evidence from North America. In many societies here, knappers were older males, and the procurement and knapping were the work of specialists sometimes shrouded in mystery (Seeman 1984; Topping 2005). Apparently the products of the knappers

played an important role in various rituals. Nonetheless, the knappers themselves did not gain any political power, only recognition from their group (ibid).

In spite of the dichotomy in the examples provided above, ethno-historical studies are valuable. This is shown by Clark and Parry, who have analysed craft specialisation among 53 non-industrial societies ranging in complexity from bands to empires all over the world (1990). Based on the evidence from these societies, they come to the conclusion that the full-time production of implements should be associated with complex societies such as highly stratified states, whereas patronized craft specialisation and the production of ‚hypertrophic' (luxury) goods correlate with agrarian, ranked and chiefdom societies (Clark and Parry 1990, 321). Clark and Parry see patronized craft specialisation as a way of converting a surplus of food production into other things such as status goods and the production of goods for exchange (Clark and Parry 1990, 322; see also Hayden 1995). Specialisation is thus seen as the pivotal point in the social process ending with stratified societies (ibid).

Accordingly, scholars interpret the presence of time-demanding crafts as proof of the presence of full-time or attached specialists (see also Stafford 1998 and 2003). While this was not the case in the New Guinea Highland, other ethnographic parallels support such statements (cf. David and Kramer 2001, 328 ff.). Turning to modern dagger replication experiments, which for obvious reasons do not include the time-demanding extraction, transportation of flint and so on, considerable diversity is evident depending on the particular dagger subtype that is replicated. Among type I daggers, the often extremely large and prestigious I C subtype – comparable to the ceremonial axes of New Guinea with regard to the symbolic values attached to the item – is the most time demanding. This is due to the surface grinding, which is a necessity if the parallel pressure-flaking is to be successful (Stafford 2003). In the reproduction of 15 daggers of the I C subtype, Stafford used, on average, 10.6 hours per dagger (ibid). Greg Nunn, another flint knapper, estimates that he uses 10 to 29 hours on each dagger (2005 and 2006).

However, when dealing with daggers of more ordinary sizes and subtypes, I A and I B for instance, which constitute the majority of daggers, the skill demanded and the expenditure of time involved are quite different. In the above-mentioned small-scale experiments the flint knappers spent two and a half hours and three hours and fifteen minutes respectively on the fabrication of two almost finished daggers of subtype I B. As mentioned above, Stafford used an average of two and a half hours in producing a large dagger ready for grinding.

Nevertheless, in the Late Neolithic, the production time for ordinary daggers must have been even shorter due to the skill and specialisation of production. Most likely, young children started learning a wide variety of crafts from their parents or other members of the household out of necessity, and in this way they became very skilled in many different crafts, including flint working. A form of apprenticeship most likely did occur, but probably in an informal way and including more people than suggested by Apel (Apel 2001, 338 ff.). Such a way of learning is described by Hayden and Cannon, who analysed craft learning and inter-community interaction among three un-stratified Maya farming communities (1984). The questioning of 154 households showed that 30 different crafts were being practiced presumedly on a part-time basis and that crafts practiced within the household were often taught by the family (ibid. 341 ff.).

It is in harmony with my own investigations that due to the abundance of raw materials, flint knapping and flint extraction around the Limfjord were not, and could not, be monopolised or restricted to a few persons. At the most, knapping – especially of weapons – was restricted to a specific gender – men – as is suggested by many ethnographic analogies, e.g. in Kenya (cf. Larick 1991, 300; Hodder 1982b, 59 ff.). Furthermore, the tradition of working flint was most likely deeply internalised in people through the reproduction of old traditions and conventions not allowing any restrictions in the craft. These traditions ascertained that most people (men) were capable of knapping flint.

To my knowledge, chopping flint was as normal as other crafts practised in short intensive periods, daily, or whenever necessary in the household. Examples of such crafts are pottery, carpentry – for instance, in the shape of bow-making or house building – weaving, agriculture and so forth (cf. Earle et al., 1998, 13). All such crafts demanded skill and know-how and some kind of apprenticeship if the outcome was to succeed. For instance, in building a bow one should know which tree to use, how to dry the wood, how to tiller the bow and so on (cf. Seeman 1984, 10 ff.). However, did specialised crafts in Late Neolithic society almost resemble the craft guilds of the Middle Age? The answer to this question is probably ‚yes' – if one accepts the definition provided by Arnold: that specialists were the people who because of their special skills performed the craft better than others (1984, 38).

Viewing this information in light of the settlement structure provokes many more questions, in that the settlements, as mentioned above, were in all probability small, dispersed and labile, consisting of two or three farms situated within large resource areas. Assuming that each household was composed of a nuclear or extended nuclear family consisting of four to six adults and a number of children, such a small hamlet could include eight to eighteen adults (Nielsen 1999, 128). Were such communities, even if organised as part of larger groups, capable of employing full-time specialists? We have no final answer to this question. Still, I believe that besides mastering a number of other crafts, most men were capable of producing ordinary daggers of the types from Bejsebakken and Hasseris Hill as well as other flint tools, whereas only very few and very skilled persons would have been capable of manufacturing high-quality daggers such as the I C subtype. This should nevertheless not be taken as an indication of full-time production. Here we must bear in mind that we only know of approximately 250 daggers of this type within Jutland, Norway and Sweden (Lomborg 1973, 40; Scheen 1979), corresponding to c. 7.4 % of all type I daggers in these areas[15]. The standardisation within this rather limited number might indicate that these daggers were produced by a limited number of craftsmen. Furthermore, they might have been manufactured within a more limited period of time than the 400 years generally said to be the production time span of type I daggers (Apel 2001, 273; Vandkilde 1996, 13).

To sum up, the production of type I daggers was not carried out from a few centralised workshops and therefore did not reflect a monopolised control over resources and production. On the contrary, part-time household production of daggers and part-time extraction most likely took place on most settlement sites in northern Jutland due to the abundance of flint and old conventions connected to this craft. These sites produced the bulk of ordinary daggers, and some of them were able to produce daggers of supreme quality and size. This is illustrated on most contemporary sites where information on the flint waste is available such as Gug, Bejsebakken, Myrhøj and so on (cf. Apel 2001, 157 ff.; Thorpe 2000, 75).

Apparently, a flint-worker identity was of secondary importance to human actors and society, as shown by the graves, which display most men as warriors (Sarauw 2007; Vandkilde 2005a, 22). This is in contrast to contemporary graves in, for instance, Bohemia and Great Britain where grave gifts include leather, copper, gold and flint working (cf. Brodie 1997, 303 ff.; Turek 2004). However, especially in Bohemia and Great Britain, where extremely rich graves are known, the socio-economic structure probably deviated from the Danish one. The fact that on the continent and in South Scandinavia daggers in general were seen as a symbol of maleness and perhaps warriorhood created the demand for more daggers, especially in the flint impoverished regions of South Scandinavia. This led to the commodification of flint daggers and resulted in the standardisation of production. Thus, the flint dagger could almost be looked upon as a kind of ‚money'. The importance of the dagger as a commodity and the nature of the exchange will be further analysed in the following section.

[15] Information regarding the Swedish daggers was kindly provided by Jan Apel.

The organisation of trade and exchange

Today money is the pivotal point of most economic transactions, and supply and demand set the price within the world market. Most material items are obtainable and the value of all goods is comparable on a world-wide price scale. Furthermore, transactions typically take place between strangers without any social obligations whatsoever.

In societies without a monetary system such as those of the Late Neolithic, complex economic systems influenced by social life may have been present, as is the case with many anthropological societies today. This line of thought will be further explored in the following part in order to understand which mechanisms controlled the exchange of daggers and why certain daggers such as the prestigious I C subtype only reached particular areas.

Returning to the question of the nature of the economic system that characterised the Late Neolithic society, no general model following, for instance, the classic substantivist and evolutionary models put forward by Polanyi (1957) or Sahlins (1972) is in my view directly applicable. An example of such complexity is provided by Malinowski's well-known descriptions of the *Trobrianders* in the western Pacific (1978 [1922]). In this matrilineal society where agriculture, especially the growing of yams, was the main occupation, several economic systems coexisted (Thomas 1991). The most well-known one is the kula trade, which involves the exchange of armshell and necklace valuables made of shells. Individual agents did so on behalf of powerful men on and between the islands in the south-western Pacific, and in this way the trade covered an area of approximately 350 km in diameter. These items, which periodically returned to the exchange networks, were symbols of rank and prestige and were indirectly meant to make their owners famous through the stories they carried (Malinowski 1978 [1922], Weiner 1988, Cambell 2004). As well as this long-distance exchange in prestige goods, negotiated exchange of food took place, in the shape of vegetables, pigs and fish for instance. Furthermore, yams were given to relatives as payment in connection with magical conjurations and as tribute to political alliances or to people of a higher rank (Hylland Eriksen 1993, 202 ff.).

Some of these transactions could also be understood within the concept of gift economy. The primary aim of offering a gift is to establish and expand social relationships, to form friendships, and to maintain a social position (Mauss 1990 [1925]; Thomas 1991, 14 ff.). In Melanesia the presentation of a gift often included feasting and publicity. This created a bond of reciprocal obligations between giver and receiver. Thus, gifts are to be seen as unique, inalienable objects that could only be exchanged under specific circumstances. Such distinctive objects are easily recognised and furthermore transmit a message about, for example, a specific historical event (Earle 2004, 114; Vandkilde 2000, 32; Weiner 1988). At the same time, gift giving is competitive and a way of establishing and maintaining rank (Barrett 1985, 100; Olausson 2000, 131; Hayden 1995, 24).

In contrast to inalienable objects, alienable objects are commodities produced with the purpose of being exchanged – they are objects of economic value (Earle 2004, 114; Vandkilde 2000, 32; Weiner 1988). The large bulk of ordinary type I daggers found in Norway and most of the single-type dagger hoards are interpreted here as commodities produced with the sole

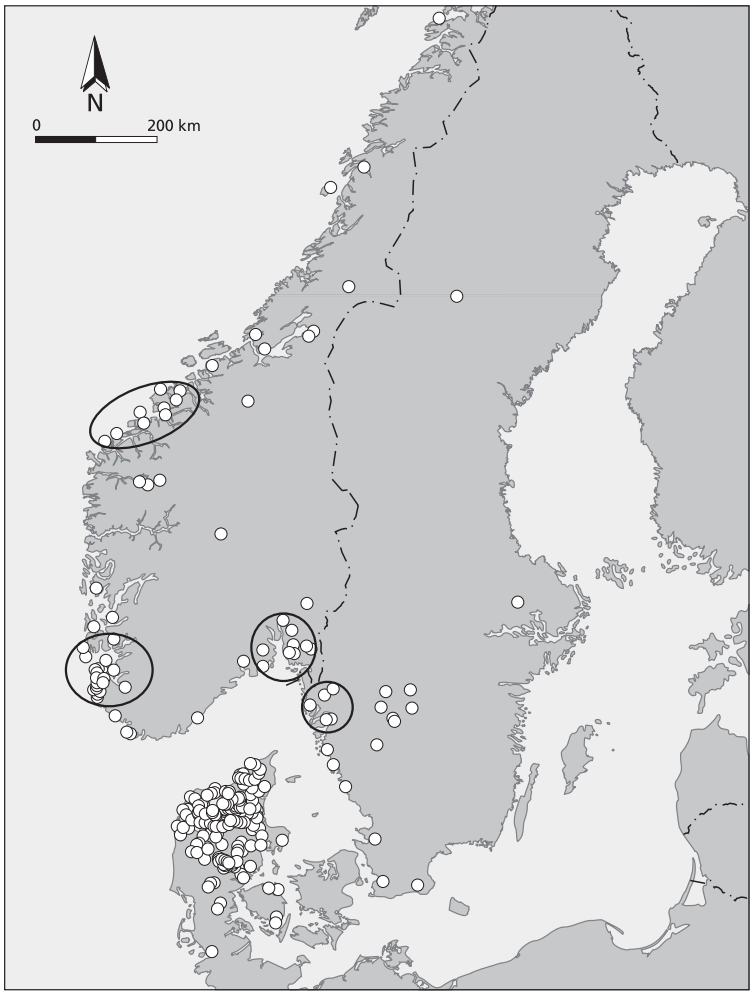

Fig. 21. Map showing the distribution of daggers of the I C subtype within South Scandinavia and northern Germany. Potential points of contact shown as circles. Data from Apel 2001, Lomborg 1973, and Scheen 1979.

purpose of being exchanged. Such exchange could have had the character of regular trade with commodities. However, the fact that the prestigious daggers of the I C subtype occur in limited numbers in Norway and western Sweden might indicate that other, more personalised forms of exchange were also involved *(Fig. 21).* One may imagine that these parallel-retouched daggers were used as special gifts the first time or every time contacts were established with partners in the exchange networks. In this way special bonds of obligation were created between local people of high status or influence. Furthermore, by presenting exotic daggers to merely a few people, daggers in general were made desirable. Flint daggers transmitted partial and contradictory knowledge about the place of origin, the people who made them and so forth – knowledge that might have led to the intensification of demand (Appadurai 1986, 56).

Addressing the question of consumption of the Jutland type I daggers, three areas present themselves: a primary, a secondary and a marginalised area. The primary zone of production and consumption encompasses northern Jutland (Lomborg 1973, 32 ff.). From this area daggers

	Skanderborg	Viborg	Aalborg
Average length (cm)	23.8	21	17.8
Average width (cm)	3.8	3.9	3.9
Total number of daggers	41	104	235
Context (grave / hoard / settlement)	100 / 0 / 0	87.5 / 12.5 / 0 %	46.4 / 43.4 / 10.2 %

Table 6. Average length and width of samples of type I daggers within the old counties of Aalborg, Skanderborg, and Viborg. Besides, the contextual distribution in percent is shown.

were distributed to the rest of Jutland and to the secondary and marginalised areas. However, household production must also have taken place in other locations where raw materials were easily obtainable, such as on Djursland as revealed by the Fornæs site (Glob 1951; Olausson 1997 and 2000). The eastern parts of Denmark had an independent production of type I daggers, as illustrated by the distribution of the subtype I D, which clearly was produced and distributed in south-eastern Denmark along with type II (Madsen 1978, 55 ff., Kristiansen 1987, 35 f; Rasmussen 1990, 40).

In order to investigate the nature of the distribution within Jutland the average width and length of a sample of type I daggers have been compared *(Table 6).* Such an investigation is in accordance both with the examinations made by Apel, who investigated the degree of sharpening of the blades and the length of the Swedish dagger material (Apel 2001, 305 ff.), and with the investigations made on the Neolithic axe distribution in Britain (cf. Bradley and Edmonds 1993; Hodder and Lane 1982). The question is whether the daggers were generally exchanged down the line – i.e. from hamlet to hamlet – resulting in smaller and re-sharpened daggers in the periphery of the production area, or distributed by direct exchange (ibid.).

The average lengths and widths of daggers recorded in the old counties of Aalborg, Viborg and Skanderborg have been compiled in table 6. Both the counties of Viborg and Aalborg lie on the border of the flint-rich Limfjord region, whereas Skanderborg is situated in eastern Jutland. These statistics imply that within Jutland the largest daggers are not necessarily clustered in the Limfjord region. However, all the daggers from the county of Skanderborg are found in graves and several of them belong to the I C subtype. As we have seen above, this improves the statistics, whereas the daggers from Viborg and especially Aalborg also include daggers found in hoards, i.e. smaller daggers. Nevertheless, if we isolate daggers found in graves in the old county of Aalborg greater correspondence between the counties occurs: in the old county of Aalborg the average length is 20.1 cm and the average width 3.8 cm.

In my opinion the concentration of long daggers, some of the I C subtype, in the county of Skanderborg indicates that direct contact existed between this area and the Limfjord area of production. Such contact may have been maintained by kinship ties between communities.

Moving on to the secondary areas of consumption, the coastal zones of Norway and west Sweden are especially interesting. The status of these areas as secondary areas of consumption is strongly implied by the general distribution of type I daggers and the total number of daggers in these areas (Apel 2001, Fig. 9:2 and table 9:2). Furthermore, the distribution of type I C daggers might indicate potential points of contact or areas with which certain bonds were established. In Norway such contact points could have been the Oslo fjord area, the Stavanger area, or the coastal zone of Møre and Romsdal in north-western Norway *(Fig. 21)* (Solberg 1994). Besides, these areas contain the majority of the 600 type I daggers known from Norway (Apel 2001, 295). In Sweden the main area of contact may have been the Gothenburg area. The bulk of daggers found in the central parts of Västergötland may be seen as reflecting an internal Swedish distribution or it may indicate that people from this area were somehow closely related to the

Parish	Average length	Average width	Number of daggers	Approximately distance from Limfjorden
Norway				
Østfold	16.7	Not available	27	290
Akershus	13.7	-	9	360
Hedmark	16.4	-	11	510
Buskerud	14.8	-	14	370
Vestfold	14.4	-	20	270
Vest-Agder	14.1	-	19	210
Rogaland	15.7	-	126	300
Hordaland	14.7	-	16	420
Sogn and Fjordane	16.9	-	11	540
Møre and Romsdal	16	-	50	630
Sør-Trøndelag	15.5	-	25	690
Nord-Trøndelag	16.2	-	9	850
Nordland	17	-	7	1130
Total			**344**	
Sweden				
Scania	13.4	2.9	230	280
Blekinge	13.5	3.2	9	370
Halland	14	3.2	61	210
Småland	11.5	2.2	10	310
Gotland	13.7	2.8	8	550
Västergötland	14.2	3.4	119	260
Östergötland	13.4	2.9	19	410
Bohuslän	13.8	3.4	62	210
Dalsland	13	3.3	34	260
Närke	11.3	2.9	12	410
Södermanland	12.8	3.1	11	490
Uppland	13	3.4	12	590
Öland	14.3	3.7	5	440
Total			**592**	

Table 7. Average length and width of daggers distributed in areas in Sweden, and average length of daggers distributed in parishes in Norway. Only areas / parishes where seven or more measurable daggers are present are included. Furthermore, the approximate straight-line distance from the centre of the areas to the centre of the Limfjord is presented. Data kindly provided by Jan Apel.

people living in the coastal zone. However, as shown by Apel, the southern and western parts of Sweden were also connected to the eastern production area, as indicated by the distribution of type II and III daggers (Apel 2001, 293). Furthermore, due to the presence of secondarily deposited flint resources in Scania some local production could have taken place here. But this is not likely since evidence of Late Neolithic mining is lacking (Högberg et al. 2001, 200 ff.; Olausson et al. 1980, 192) and the existence of such production is not supported by the short average length of the Swedish type I daggers found in this area. They are simply rather short when compared to other areas such as Västergötland or the Gothenburg area *(Table 7, Fig. 22)*. Besides, the single-type dagger hoards that often characterise a primary production area (cf. Vandkilde 2005a, 15–16; Rassmann 2000, Abb. 14) are not present in Scania.

A comparison of the average lengths of type I daggers in Denmark, Norway and Sweden demonstrates striking dissimilarities *(Tables 6–7, Figs. 22–23).* The average length of all measurable type I daggers (435) in Norway is 15 cm, whereas the corresponding number in Sweden (585) including Scania is 13.6 cm. In Denmark a sample of 511 type I daggers gave the average length of 19.5 cm. As seen from *table 7*, the differences in average lengths between the different areas in Sweden and especially Norway are not dependent on the assumed distance to the

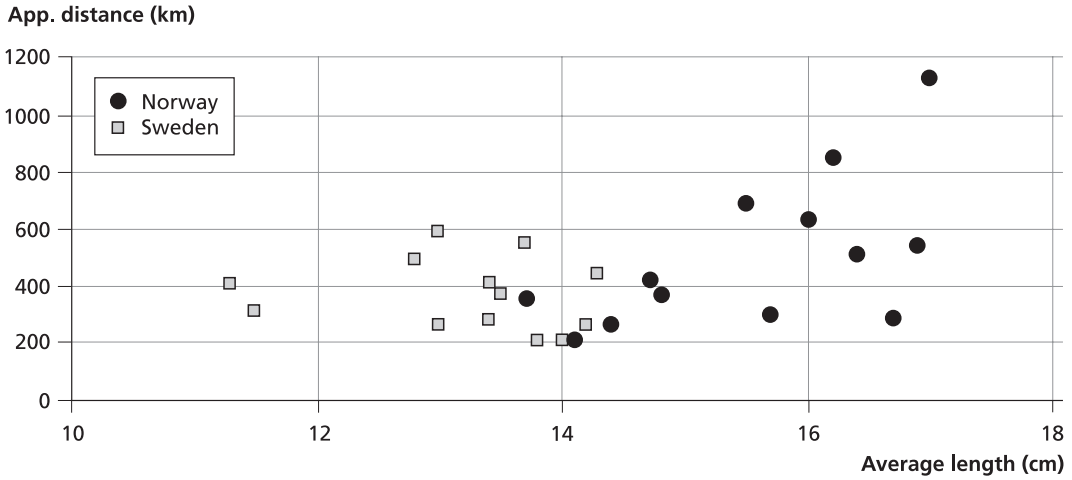

Fig. 22. Average length of Swedish and Norwegian type I daggers distributed according to parish / area (*Table 7*) and the approximate distance to a possible production area – the Limfjord.

flint source. This, along with the distinct coastal concentrations in the areas mentioned above, indicates that the exchange took place by sea and had the character of direct exchange. Thus, this investigation supports the similar conclusions reached by Apel and Solberg (Apel 2001, 320; Solberg 1994, 121). This nature of the exchange is exemplified by the hoard found in a bog at the island of Karmøy on the west coast of Rogaland only a few metres above ocean level. Among other things this hoard contained 25 unused daggers of type I (two of which belonged to Lomborg's I C subtype), two feeding knifes and more than 200 flakes[16].

This ritual offering may have been made as a way of giving thanks for a safe journey by traders or journeymen who had completed a more than 350 km long journey across the Skagerak and along the Norwegian shorelines. Quite possibly this offering merely consisted of a small part of the shipment, indicating that the ships normally carried quite a large amount of flint daggers and other commodities of flint.

Nonetheless, the large differences in the lengths of the Scandinavian daggers cannot solely be explained by the fact that many Norwegian and Swedish daggers were heavily re-sharpened, since the daggers, as already mentioned, do not lose much length from this process (Apel 2001, 314). This is further documented by the fact that even though the average length of the Swedish daggers was almost 6 cm shorter than the Danish ones, the average width of the Swedish daggers was only 0.9 cm narrower than that of the Danish daggers[17]. This lends support to the conclusion that most daggers exported to Norway and especially Sweden were shorter than the daggers kept in the production area (see also von Carnap-Bornheim / Salač 1996). Shorter daggers apparently also possessed a high symbolic value, especially in the flint-deprived regions of Scandinavia (see also Skoglund 2004). This assumption is sustained by ethnographic analogies from New Guinea Highland (cf. Højlund 1979).

[16] Information provided by the Museum of Archaeology, Stavanger. The average length of 19 daggers was 18.4 cm, and the width 4.2 cm. Several conditions indicate that the daggers were made by the same knapper or a few knappers working in close collaboration. For instance, five daggers of subtypes I A and B show traces of partial grinding, and this can hardly be seen as a coincidence.

[17] 643 type I daggers from Sweden had an average width of 3.1 cm, whereas the corresponding number for 533 Danish type I daggers was 4 cm.

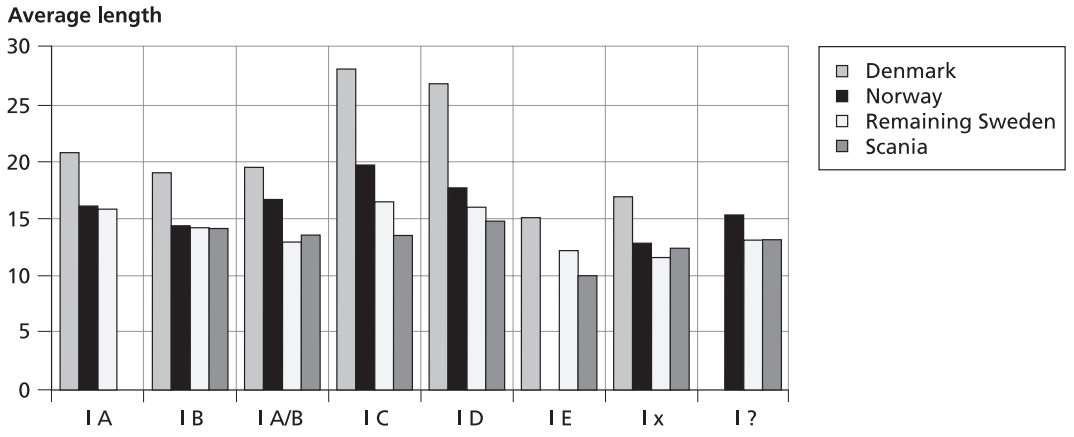

Fig. 23. Average length of type I daggers distributed in subtypes and different parts of Scandinavia. Only a sample of the Danish type I daggers is included. The total number of daggers in each area is shown in brackets.

Even though Apel has shown that Danish daggers were also distributed to areas south of Jutland (Apel 2001, 294 ff.), these areas must be considered marginal with regard to the consumption of Danish type I daggers. This is shown by the statistics delivered by Apel (2001, 295), which indicate that the export to these areas was minimal. Furthermore, the fact that daggers of supreme size and quality such as the I C subtype did not reach these areas underlines the argument *(Fig. 21)*. That contacts between especially northern Jutland and Europe existed is shown by the distribution of Bell Beaker pottery and metal in Denmark (cf. Liversage 2003; Sarauw in prep.; Vandkilde 1996). However, Danish daggers apparently played only a minor role in these contacts. This is indicated for instance by the distribution of type I daggers in the Netherlands, from where only 28 such daggers are known (Bloemers 1969). In the Netherlands daggers made of flint were naturally not as attractive as daggers made of copper. It was easier to dispose of flint daggers in Norway and Sweden, where metal was harder to get and where knowledge about metal was most likely slight. The daggers probably reached the Netherlands as part of a gift exchange enabled by transactions of other kinds. This is indicated by the length and width of the type I daggers found in this area. The average length of 23 daggers was 18.7 and the width 4.1 cm (calculated from Bloemers 1969). The width indicates that in general the daggers were not used very much (re-sharpened). Two of the daggers had lengths of 26 and 28 cm respectively (ibid., 65 and 67). Such daggers were most likely personal gifts indicating the existence of direct contacts (Apel 2001, 303; Varberg 2005, 88).

Regarding the type I daggers found in Schleswig-Holstein and Mecklenburg other conditions existed. We cannot rule out that some Danish daggers, especially of the subtypes belonging to LN II, reached Mecklenburg (Rassmann 1993, 20 ff. and 2000, 18 ff.). The primary flint resources of Rügen, however, most likely supplied Mecklenburg and the west Polish areas with daggers (cf. Rassmann 2000, Abb. 14). The importance of dagger production in the Rügen area is illustrated by the presence of numerous production sites, dagger hoards, and the general distribution of preforms and type I daggers (Rassmann 1993, 21, and ibid.). Furthermore, the length of type I daggers seems to be smaller the further away from Rügen the daggers were found (Rassmann 1993, 20). The average length of daggers found in graves in Mecklenburg is 17.9 cm (ibid.), which is a rather high average compared to the Swedish or Norwegian daggers.

Moreover, as documented by the Tegelbarg site near Flensburg as well as the distribution of dagger preforms in the coastal area of Schleswig-Holstein along the Baltic Sea, an independent production of type I daggers undoubtedly took place in this region (Arnold 1974, 54 &1981, 159–160, Kühn 1979, karte 2). Forty-six daggers of type I, exclusively from graves in Schleswig-Holstein, had an average length of 18.4 cm (data calculated from Kühn 1979. See also Siemann 2003).

To sum up: Apart from Jutland, the main areas of consumption of Jutish flint daggers of type I were Sweden and especially Norway. Schleswig-Holstein and northernmost Germany must by comparison be regarded as marginal consumption areas due to their own dagger production. As shown by the two different groups of daggers that reached Norway and Sweden, different modes of exchange must have existed. The vast majority of more ordinary daggers were probably exchanged as commodities. This commodity exchange may have been returned in hunting products such as antlers, furs and hides (Solberg 1994, 123) or perhaps even women (Ebbesen 1981b, 104). However, the prestigious daggers of the I C subtype may rather have reached these areas as gifts. Furthermore, the distribution of the type I C daggers and the marked concentrations in, for instance, Rogaland gives a strong indication of the specific local areas with which contacts were made. Such contacts may also have enabled the exchange of ideologies and the establishment of long-distance alliances even based on the establishment of kinship relations. The presence – although limited – of Bell-Beaker-like pottery in Norway (cf. Myhre 1979; Prescott and Walderhaug 1995, 263) and in Sweden (cf. Pettersson 2000, 53 f.) may be considered evidence that ideological traits sometimes followed the exchange networks.

In my opinion the concept of redistribution often associated with societies at the level of chiefdoms (Polanyi 1957) is not a relevant issue as far as the character of Late Neolithic society in Denmark is concerned. In the archaeological record there is no clear evidence in support of a marked differentiation of social structure characterising chiefdoms (Sarauw 2007). Instead society seems to have been more egalitarian.

There is no straightforward answer to the question as to whether the expeditions to the north were organised by people living in the Limfjord region or by people from Norway and Sweden. Most likely people in both areas were capable of carrying out such expeditions. However, the vast distribution of Bell Beaker pottery in northern Jutland might indicate that people in this area also travelled towards the south by sea and that sea-faring was quite normal at the time (cf. Østmo 2005).

Whether the production of daggers brought extraordinary wealth to the people living in the Limfjord area or the production was just a way to maintain a certain way of living in a marginalised area (cf. Apel 2004) is still an open question. The dagger exchange towards the north may well have brought commodities that went into local circulation or were exchanged further south for items of bronze and other goods. We might say that the flint dagger production and the embedded technology of northern Jutland resulted in this area becoming part of a north European network. Maybe it even acted as a gateway community in the exchange of goods between northern Scandinavia and the Bell Beaker communities of northern and western Europe. This function may explain why parts of the ideology and material culture of the Bell Beaker communities first and foremost gained a foothold in northern Jutland and not in the remaining parts of South Scandinavia.

Conclusion

This article aimed at using a contextual approach to reveal aspects concerning the production and consumption of Jutish type I-daggers on a regional level. The starting point was an analysis of a sample of flint waste, preforms and daggers from the Bejsebakken settlement, situated at the heart of primary flint resources. Furthermore, the contemporary flint mines at Skovbakken, located only 750 m north of Bejsebakken, were evaluated, and it was shown that the original procurement sites may have covered an area of approximately 13,750 sqm – almost two and a half times as big an area as estimated by Becker. Moreover, it was estimated that more than 800 mines might have been located here.

As seen from the presence of numerous intact and fragmented daggers and blanks, along with the information provided by the analysis of a selection of waste from a small house, the production of type I daggers surely took place at Bejsebakken. This analysis furthermore revealed a group of daggers that has been neglected in research, i.e. small type I daggers from settlement contexts. With regard to their size, most of these daggers differed markedly from what we would imagine of daggers found near mines with high-quality flint. These differences are thus related to the context. Larger daggers of better quality produced at the same site should probably be found elsewhere in other contexts, such as in the graves, and were generally not left at the settlements as refuse.

In general, the raw material was both erratic and mined flint – most surprisingly, people were not concerned with the source of the flint as long as its quality and nodule size were acceptable. The analysis of the cortex of the daggers has shown that even very small mined nodules (c. 10 cm of length) were used – however, the final result was typically daggers c. 10–20 cm in length. This, together with modern experiments on procurement of flint in Scania, indicates that the exploitation of the mines only resulted in a limited amount of high quality nodules of a certain length.

As shown above, several classes of daggers of different sizes and qualities were apparently produced within the same area, Hasseris Hill. In addition, they had different symbolic meanings, as implied by their different contexts. The first group of daggers, which was intended for daily use and most likely used by men, women and children, encompasses smaller lancet-shaped daggers made on whatever flint was available. The second group comprises larger daggers of good quality exemplified by most of the daggers in the Danish hoards. Such daggers were alienable objects, commodities, intended for exchange. However, when exchanged these daggers became personal belongings of men symbolising maleness and perhaps warriorhood (Vandkilde 2005). The last group of daggers belongs to the same general sphere. However, these daggers of superior size and quality, represented by the I C subtype, were the finest and probably most attractive daggers a male could posses. Such daggers ended their life in a burial of a prominent male, hence possibly reflecting the emergence of a ranking system. Still, type I C daggers and fragments were few in number at Bejsebakken, which may reflect that only a limited production of such daggers took place here.

As documented above, the same flint smith probably manufactured most of the daggers within individual hoards. As I have demonstrated above, this production was hardly the work of full-time specialists located at a few centralised workshops. On the contrary, most flint knappers were probably capable of making such average and standardised daggers, and most likely production took place on most settlement sites within the Limfjord region. This interpretation is in accordance with a dispersed and labile settlement structure (Sarauw 2006) consisting of small egalitarian communities where farming and animal husbandry were still the base of subsistence. As indicated by the main distribution of Bell Beaker pottery and type I-daggers, these communities were loosely joined within a Bell Beaker context sharing material culture and maybe even ideology (Sarauw in prep.). These small communities – together or individually – were capable of organising the trade and exchange, which primarily had the character of exchange of commodities even though gift giving was probably used when contacts were initially made to potential partners of exchange or alliance. As other scholars have suggested, my work confirms that the Limfjord region acted as a link between Europe and the rest of Scandinavia, especially Norway, and in this way the people of the Limfjord region gained access to the metal circulating within the European networks of exchange (cf. Shennan 1993 and 1998).

Summary

In many studies of the early Late Neolithic, the massive production of bifacial flint daggers of lanceolate shape (type I) in northern Jutland is ascribed huge importance with regard to the material wealth, which is evident for instance in the fact that metal was introduced.

However, as the present analysis of c. 550 type I daggers from graves, settlements and hoards documents, the technological quality of the daggers varies a lot.

In order to examine the socio-economic aspects of flint dagger production and exchange on a regional level, this article constitutes a case study of ‚Hasseris Hill' situated near Aalborg in northern Jutland within the core area of primary flint resources. A recent excavation has revealed a large settlement site, Bejsebakken, from the early Late Neolithic, situated only 750 m from the contemporary flint mining complex at Skovbakken. The presence of numerous bifacial thinning flakes, dagger performs and finished daggers, documents that daggers were actually produced at Bejsebakken. Furthermore, six hoards containing a total of 86 type I daggers have been retrieved in the vicinity of Bejsebakken. They reveal that daggers deposited together in a single hoard were largely produced by the same craftsman. In light of this new information the article discusses such socio-economic aspects of society as dagger production and extraction of flint in relation to social organisation.

Zusammenfassung

Zahlreiche spätneolithische Studien beschreiben die umfangreiche Produktion von lanzettförmigen Feuersteindolchen des Typs I in Nordjütlands. Sie veranschaulicht den Reichtum dieser Region, den auch die eingeführten Metallfunde belegen. Die Auswertung von ca. 550 Feuersteindolchen vom Typ I aus Gräbern, Siedlungen und Hortfunden lässt beträchtliche Qualitätsunterschiede erkennen.

Ziel der vorliegenden Fallstudie ist die Untersuchung von sozioökonomischen Strukturen in welche die Dolchproduktion und der -austausch eingebettet sind. Die Analyse erfolgt auf einer regionalen Ebene und stützt sich auf den Fundplatzes von ‚Hasseris Hill' nahe Aalborg. Es handelt sich um eine Kernregion der Dolchherstellung in Nordjütland, die über reiche Feuersteinlagerstätten verfügt. Ausgrabungen der letzten Jahre führten hier zur Aufdeckung des ausgedehnten Siedlungsplatzes von Bejsebakken, nur 750 m vom modern Flintabbauplatz von Skovbakken entfernt. Das Vorkommen von zahlreichen bifazialen, dünnen Abschlägen, Dolchhalbfabrikaten und Feuersteindolchen belegt eine spätneolithische Dolchproduktion in Bejsebakken. Weiterhin sind sechs Hortfunde mit 86 Feuersteindolchen vom Typ I aus der Umgebung Bejsebakken bekannt. Sie zeigen, dass die Feuersteindolche eines Hortfundes jeweils von einem Handwerker hergestellt wurden. Aufbauend auf diesen Beobachtungen diskutiert der Artikel die sozioökonomischen Strukturen der Dolchproduktion und des Flintbergbaus.

Résumé

De nombreuses études sur le Néolithique tardif soulignent la production impressionnante dans le nord du Jutland de poignards lancéolés en silex du type I ainsi que son rôle important dans l'enrichissement de la région et l'introduction de la métallurgie. L'analyse de quelques 550 poignards en silex du type I provenant de tombes, habitats et dépôts révèle d'importantes différences de qualité.

Le but de cette étude de cas est d'examiner les structures socioéconomiques qui encadrent la production et l'échange des poignards. Cette analyse se déroule à un niveau régional et se base sur le site de « Hasseris Hill » près d'Aalborg. Il s'agit là d'une région centrale de la production de poignards du Jutland septentrional, disposant de riches gisements de silex. Les fouilles des dernières années ont permis de découvrir le site étendu de Bejsebakken, à une distance de 750 m seulement de la mine de silex moderne de Skovbakken. La présence de nombreux éclats bifaciaux minces, de poignards semi-finis et de poignards en silex confirme une production de poignards au Néolithique tardif à Bejsebakken. On connaît encore six autres dépôts avec 86 poignards en silex du type I provenant des environs de Bejsebakken. Ils indiquent que les poignards d'un dépôt furent fabriqués par un seul et même artisan. Partant de ces observations, l'article discute les structures socioéconomiques de la production des poignards et de l'exploitation du silex.

Y. G.

Catalogue – Type I-dagger hoards in Denmark[18]

The number in brackets refers to the number in The National Museum (NM A) or a local museum (e.g. ÅHM = Aalborg Historical Museum and FHM = Forhistorisk Museum Moesgård).

1. Dallebæk, Kåsen, Kolby parish (Samsø) (NM A358/54).
   Three daggers of subtype Ix.
   Found due to ploughing next to a brook.

2. Skræm, Skræm parish (NM A4130-32).
   Thirty daggers of type I (13 I A; 16 I B and one Ix), which all have a reddish brown patina. The average length of 29 measurable daggers is 20.3 cm. The average width of 30 daggers is 4.5 cm.
   Found by ploughing on marsh soil about 26-30 cm below surface. All were placed on top of each other, oriented N–S.

3. Agersted Bakker, Voer parish (NM A2108-9).
   Forty-five daggers of I B subtype and one dagger of subtype Ix. The average length of 44 daggers is 19.5 cm. The average width of all daggers is 4.6 cm.
   Found right next to a bog due to the extraction of peat. The daggers were placed side by side in rows of six or seven in seven or eight layers. The uppermost daggers were placed c. 26 cm below surface.

4. Ålegårds Mose, Skræm parish, (NM A4149-54).
   Six preforms, which Lomborg (1973, 165) originally classified as daggers of subtype Ix. Five of the blanks have white porous cortex. The average length is 21 cm and the average width 7 cm.
   Found together in the depth of c. 0.67 meter in a bog.

5. Geddemålsgård, Sastrup, Bjergby parish (NM A2617).
   Three daggers of subtype I B and I A/B, 12 asymmetrical flint sickles, one spearhead, and nine thick-butted axes. Especially the sickles are rather ‚used'. All were patinated in reddish brown colours. The average length and width of the daggers were 17.4 and 4.2 cm respectively.
   The artefacts were found together stacked according to types in a bog approximately two meters below surface.

6. Hvirrekjær, Snevre, Bjergby parish (Hjørring 1945/25-28).
   Four daggers – all without any patina: Two of subtype Ix, one of subtype I C, and one of subtype I A/B. The average length is 22.6 cm and the average width 4.7 cm.
   Found in a field in a depression.

7. Bjergby, Bjergby parish (NM A6086-88).
   Five ‚used' asymmetrical flint sickles and a piece classified as a dagger of subtype Ix (Lomborg 1973, 197). However, this should rather be seen as a preform. The length of the preform is 18.4 cm and the width 6.5 cm.
   Found in a peat bog.

8. Rønnebjerg, Vrejlev parish (Hjørring 10884).
   One dagger of subtype Ix and three sickles. The length of the dagger is 13.9 cm and the width 2.5 cm.
   Found together in a bog.

[18] Type I D is not included – see footnote 9.

9. Hvirrekjær II, Snevre, Bjergby parish (Hjørring 1945 / 126-33).
   Eight daggers of subtype Ix without patina. The average length of six measurable daggers is 18.3 cm. The average width of seven measurable daggers is 4.8 cm.
   Found in a depression in a field.

10. Ejby, Korslykke parish? (Odense 2579-81).
    Three daggers of Ix subtype without patina. The average length is 19.4 cm. The average width is 3.5 cm.
    Found at Ejby on the edge of a marl pit.

11. Dalbyneder, Dalbyneder parish (NM A35647-49).
    Four daggers of subtype II A, I B, and I A / B – three with a slightly reddish brown patina. A possible pendant was found together with the daggers. The average length of the daggers is 13.6 cm and the average width 3.3 cm.
    Found together due to ploughing.

12. Nør Torup, Hjortdal parish (NM A16819-22).
    Eight daggers: Two of subtype I A and six of subtype I B. The average length of the daggers is 18 cm and the average width 4.1 cm.
    Found together in Nør Torup bog.

13. Frøslev, Frøslev parish (in private collection).
    Six daggers and a fragment of a dagger. Three of the daggers belong to the subtype I B, one to subtype I C, two to subtype Ix, and one is unclassifiable / a spearhead. Furthermore, the hoard contained two asymmetrical flint sickles, ten axes and adzes, and three chisels (Ebbesen 1981b). The average length of four intact daggers is 23.6 cm, whereas the average width is 4.4 cm (calculated from Ebbesen 1981b, footnote 11).
    Found together but without more detailed information.

14. Sønder Kollemorten, Øster Nykirke parish (in private collection).
    Three daggers of subtypes I A, I A / B, and Ix. The hoard furthermore contained one flint sickle, 15 axes, and a chisel.
    No information regarding find context.

15. Engelskov, Fur parish (NM A11274-75).
    Thirteen axes and axe preforms and seven daggers: Five of subtype I A and two of subtype I B. Some are slightly patinated. The average length of the daggers is 18.1 cm, whereas the average width is 5 cm.
    Found by ploughing approximately 12 cm below the surface in a slope close to a bog.

16. Hjorthede, Hjorthede parish (FHM 6036 a–b).
    Two asymmetrical sickles and three daggers of subtype I A (one) and Ix (two). No patina. The average length of the daggers is 17.1 cm, whereas the average width is 3.2 cm.
    Found at a field.

17. Åkjær, Ulsted parish (NM A207048).
    One dagger of subtype Ix, one flint sickle, and one spearhead.
    Found in a bog.

18. Dyskov, Vester Hassing parish (Hjørring 19948–54).
    Two dagger preforms, two broad-bladed flint axes, a retouched flake, nine flakes, some of which are bifacial-thinning flakes, and 26 daggers of subtypes I A (two), I B (15), I A / B (five), I C (one), and Ix (three). Most of the artefacts had a reddish brown patina – one axe had white patina. Eighteen intact daggers have the average length 19.2 cm. Twenty-six daggers have the average width 4.2 cm.
    Found due to ploughing of a former bog.

19. Sønderholm, Sønderholm parish (NM A33564–67)
    Four daggers of I B subtype. No patina. The average length is 22 cm and the average width 4.8 cm.
    Found together three to four meters from a burial mound.

20. Vesterkjæret, Hasseris (Budolfi) parish (ÅHM 1727a–p).
    Situated at the Hasseris Hill.
    One asymmetrical sickle with gloss and 17 daggers (two lost) all besides two (I C) of I B subtype. No patina. Fourteen intact daggers have an average length of 18.2 cm, whereas 15 daggers have an average width of 4.2 cm.
    Found in 1877 close to a brick yard and approximately 67 cm below surface. Deposited in wetland? (The Danish ‚kjær' in place names means marsh or scrub).

21. Aalborg Byjord, Aalborg parish (ÅHM 2730a-e).
Situated at the Hasseris Hill.
Five daggers without patina of I B subtype. The average length of the daggers is 16.6 cm, whereas the average width is 4.5 cm.
Found together on sand under approximately 67 cm of humus. Three lay side by side and two lay in extension of the others.

22. Bejsebakken, Aalborg parish (ÅHM A457).
Situated at the Hasseris Hill.
Fifteen daggers of I B subtype without any patina. The average length of the daggers is 16.1 cm and the average width 4.4 cm.
Found in a gravel pit in 1925 approximately 67 cm below the surface between the humus and the subsoil sand. The hilts pointed downwards and the points upwards.

23. Skolebakken Øst, Gl. Hasseris (Budolfi) parish (ÅHM A647/157).
Situated at the Hasseris Hill.
Nineteen daggers of I B subtype slightly patinated in white and blue. Corresponding patina is seen on flint waste placed secondarily in the mine shafts. One of the daggers shows sign of being heavily used, whereas the other is unused. The average length of the daggers is 17 cm, while the average width is 4.3 cm.
Found together by workmen in loose chalk at or near the bottom of a refilled mine shaft (Becker 1951a and b; Bower 1953).

24. Mølleparken, Aalborg parish (ÅHM 1645/A634a–i).
Situated at the Hasseris Hill.
Eight daggers of I B subtype and a dagger hilt (wrongly classified by Lomborg as Ix). No patina. The average length of six intact daggers is 19.6 cm. The average width of all daggers is 5 cm.
Found due to the construction of a road in 1948.

25. Valmuemarken, Aalborg parish (ÅHM 71/A905).
Situated at the Hasseris Hill.
Twenty-one daggers of subtype Ix without patina. The average length of the daggers is 12.9 cm, whereas the width is 3.8 cm.
Found in a garden in 1963. The hoard was situated approximately 35 cm below the present surface. Quite a few flakes were found in the garden.

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