Journal of Danish Archaeology vol. 7, 1988, pp 7–23

A Late Palaeolithic Flint Workshop at Egtved, East Jutland

– a Glimpse of the Federmesser Culture in Denmark

by ANDERS FISCHER

INTRODUCTION

The article presents an example of a category of cultural remains that undoubtedly occurs very commonly, but which is so unassuming that it is normally overlooked during archaeological excavation and research. The present instance involves a few handfuls of flint waste (fig. 1) found close together in the sand under a tumulus near Egtved. The article reports how a detailed analysis of such a find material can give a clear picture of an event and a crafts tradition in the distant past. In addition it holds out the homily that it is just such studies of unassuming archaeological sources that are apparently a prerequisite for better knowledge of the Federmesser culture – an epoch of Denmark's Stone Age which hitherto has largely escaped the attention of culture-historians.

FIND CIRCUMSTANCES

The find was made as a bye-product of investigations in connection with the establishment of a small museum and restoration of the "Egtved girl's" barrow (Alexandersen et al. 1983). In connection with this, a ploughed-down neighbouring barrow was investigated (1). Excavation was done mechanically by scraping away thin horizontal layers over a total area of 174 m^2. The barrow itself was found to be largely obliterated, an up to 10 cm thick brownish sand layer with scattered small flakes produced from small frost-shattered flint nodules being all that was left. However, under this layer, down in the firm, apparently pure and undisturbed "subsoil sand", worked flint appeared, in this case some of it in the form of much larger flakes. These were found within an area of 1 m^2 and were encountered up to 70 cm down in the layer. The larger part stood upright in the sand.

The finds from the subsoil sand merely consisted of a few handfuls of apparently rather ordinary cores and flakes. It was therefore not immediately possible to ascertain their proper nature and age. It was clear, however, that several of the flakes fitted together, and that they possibly derived from the working of only a couple of flint nodules. This observation, and an assumption that the material could be of Late Palaeolithic origin, was the reason why the author started a closer analysis.

THE FIND MATERIAL

Altogether, 147 flint objects have been recovered from the "subsoil sand". They all consist of Senonian flint – an easily cleavable rock which occurs commonly – here and there abundantly – in Danish moraine deposits. Judging from the somewhat worn but only partially crushed natural surfaces, the present material was collected directly from the moraine – most likely in the immediate vicinity of the knapping site.

From the point of view of a flint-knapper, the selected flint is of relatively good – although not quite perfect – quality. At only a few spots were there fine inner cracks and small tough parts making the flint-knapper's work difficult.

There are no signs that the flint used had been subjected to strong frost shock before it was worked. Two of the largest and most massive objects on the other hand exhibit distinct cryofracturing sustained *after* working (fig. 10a).

All objects deriving from the "subsoil sand" have a slightly lustrous surface. In addition, the flint is strongly bleached, so that only the parts just below the cortex surface have retained the Senonian flint's original dark colour. The remainder has turned a pale grey. In some cases, the surfaces have a slightly bluish tint

Fig. 1. The 151 fragments of the Egtved flint assemblage. Scale in cm. Their coarse irregular character is due partly to the simple flaking technique and partly to the flint-knapper having taken a handful of the best blades with him on his further travels. A.F. photo.

and in many cases the outer parts of the flint have been stained by yellowish iron deposits. These conditions suggest that the soil in which the objects were bedded was originally slightly basic but later – presumably after leaching of its content of lime – became weakly acid. Small spots of hard pan, deposited on the surfaces of the flint pieces, support the impression of acid soil.

The flint objects from the brownish layer between the "subsoil sand" and the tilth generally deviate strongly from those just described. This applies as much to the size and quality of the flint nodules employed as to the working technique and chemically and physically determined surface transformation. Four relatively small flakes, stored with the objects from the brown layer, fall outside this pattern, however. They agree in every respect with the material from the deeper lying sand, for which reason they will be included in the description of finds from there which follows.

The 151 objects of the find material can purely morphologically – without reference to the results of the refitting to be described below – be divided into the following categories.

Cores, incl. fragments (fig. 10a and 10b)	4
Platform rejuvenation flakes, certain (fig. 11e)	8
Platform rejuvenation flakes, possible or probable (fig. 11f)	23
Simple blades ($L \geq 2B$), incl. fragments which definitely derive from flakes with $L \geq 2B$ (fig. 9a-j)	45
Blades with partial unilateral guide ridge (fig. 11c)	3
Blades with through-going unilateral guide ridge (fig. 11b)	1
Blades with partial bilateral guide ridge (fig. 9d)	2
Blades with through-going bilateral guide ridge (fig. 11a)	1
Simple flakes ($L < 2B$), incl. fragments	59
Flakes with partial unilateral guide ridge	2
Triangular flakes (fig. 11d)	2
Eraillure flake	1
Total, incl. fragments	151

If one takes the results of refitting into account, it is seen that there are in reality only 2 cores in the material. On the other hand it turns out that there are more platform rejuvenation flakes than the number obtained from a cautious morphological classification. The group comprises not only all those flakes designated possible or probable platform rejuvenation flakes, but also a few simple blades and various simple flakes.

REFITTING OF FRAGMENTS

The 151 pieces of worked flint from the subsoil sand, etc., have been subjected to comprehensive refitting. This was done for the following purposes:

1) to illuminate the actual event that the inventory represents – what was the purpose and result of the flint working? – and
2) to place the inventory culturally and chronologically by comparative studies of working techniques and procedures.

The refitting showed that about half of the original volume of flint had disappeared. Some of it was undoubtedly overlooked during excavation – especially the smaller fragments, since the soil was not sieved. Other material was presumably removed from the site by the flint-knapper himself, since a remarkably large part of the most slender and regular bades seem to be lacking. The absence of a considerable part of the pieces in the jigsaw puzzle reduces the chance of combining the remaining elements, but it has nevertheless been possible to piece 70% of the fragments together into larger or smaller units.

Three fragments together form a complete blade core (fig. 10b), which has been divided by secondary frost fissuring. A further number of fragments can be assembled into seven flakes, which apparently broke at the moment of detachment. Three of these flakes are each made up of three fragments and five of them each of two fragments (e.g. fig. 9j). Finally, it should be remarked that shape and flint structure suggest that two further flake fragments originally belonged together. It can thus be established that the 151 fragments together represent 2 cores and a maximum of 139 flakes. 84 of these flakes are included in refitted flake series comprising respectively 18, 13, 12, 10, 10, 6, 3, 3, 3, 2, 2 and 2 flakes.

One of the two cores found (fig. 10a) fits one of the refitted flaking sequences with ten flakes, whereas it has not been possible to match the other (fig. 10b) with so much as a single flake.

To judge from the structure of the flint, the nature of the cortex, etc., it is extremely likely that several of the refitted units derive from the dressing of one and the same flint nodule, which would thus have furnished the raw material for more than one blade core. This applies, for instance, almost certainly to two refitted units with 18 and 10 elements respectively. To this grouping, at least 3 non-fitted flakes very likely also belong. The non-conjoining core has locally a flint structure which is very closely related to this, but its considerable size rules out the possibility that it can represent the final product of the flaking sequence indicated.

To summarize, it seems probable that the Egtved flint represents the working of at least 5 blade cores which have had the following characteristics and dimensions (length, width, thickness):

- Unipolar blade core, of semiconical shape (fig. 10b), 11 × 10 × 10 cm. Scars from 4 blades are seen. After 3 unsuccessful attempts at rejuvenating the platform, production has been abandoned. Only the core is present.
- Unipolar blade core of semiconical shape, originally c. 15 × 10 × 9 cm. Blades detached along 2/3 of the circumference. Core missing.
- Unipolar blade core of semiconical form, originally c. 15 × 6 × 6 cm. Detachment of blades along a good half of the circumference. Core present (fig. 10a).
- First bipolar, later unipolar blade core of semiconical shape. Originally c. 15 × 10 × 8 cm. Detachment of blades along 2/3 to 3/4 of the circumference. The completely exhausted core absent. The final stages of the flaking are shown schematically in fig. 2.
- Bipolar blade core of approximately cylindrical shape, originally c. 20 × 12 × 15 cm. Detachment of blades along 2/3 to 3/4 of the circumference. Core missing. The later stages of the flaking are shown schematically in fig. 3.

Several of these 5 groupings are very similar with respect to flint structure and cortex, so the material probably derives from the working of three large flint nodules at the most.

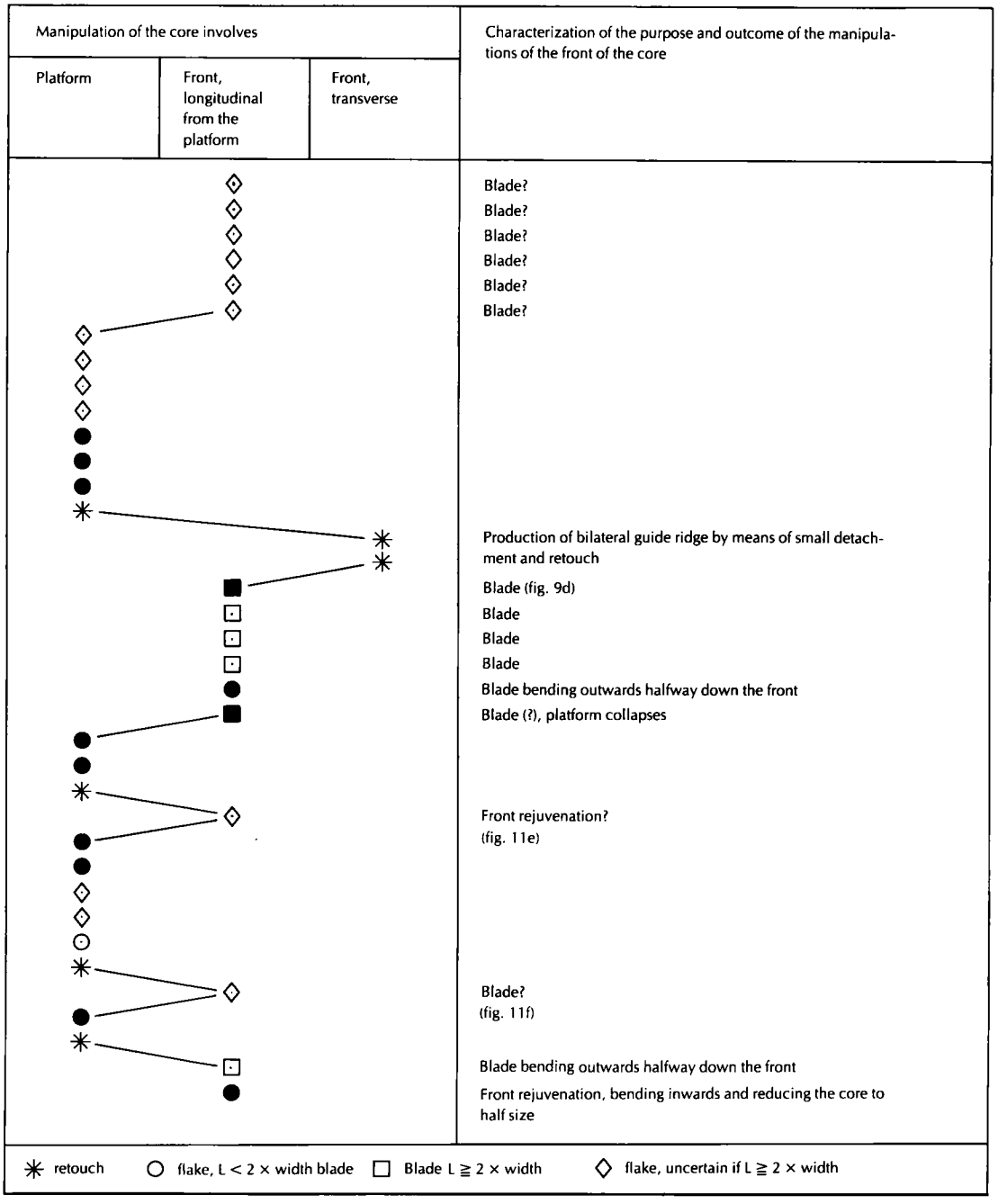


Fig. 2. Schematic description of the flaking sequence for one of the unipolar blade cores. The time sequence runs from above down. In the interests of clarity, only flakes with a length exceeding 2 cm are shown. Solid signatures indicate extant flakes, open signatures flakes known only in more or less complete negative.

The first stages of the sequence are not known, whereas it is likely that the last-produced extant flake – due to the unsuccessful trajectory of flaking – put a stop to the use of the core.

The flaking is characterized by a cyclically repeated working process comprising first the formation of the platform, next the retouching of the platform ("preparation") and finally longitudinal blade detachment. This working process is supplemented by adjustments in the shape of the core by means of transverse flaking on the front.

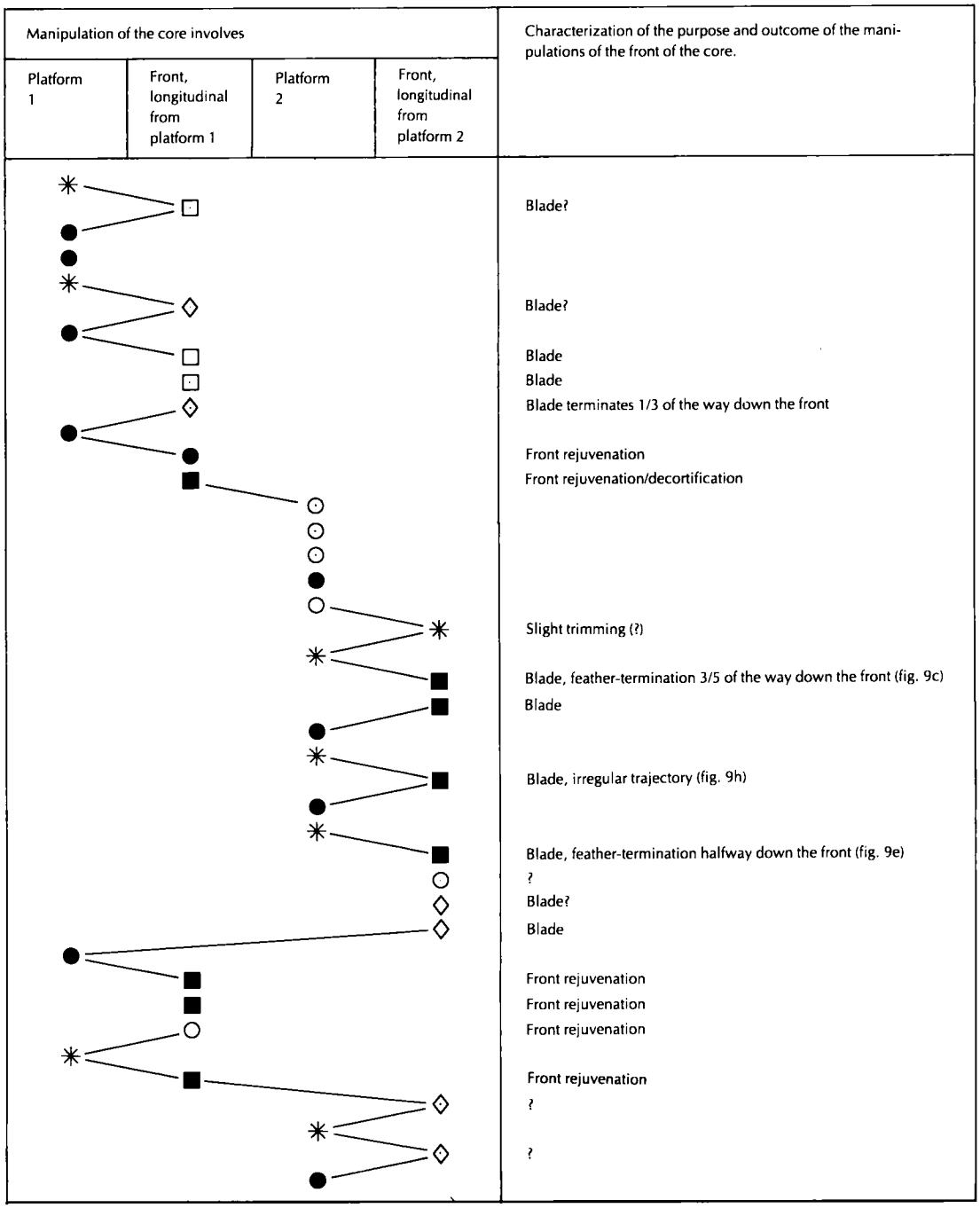
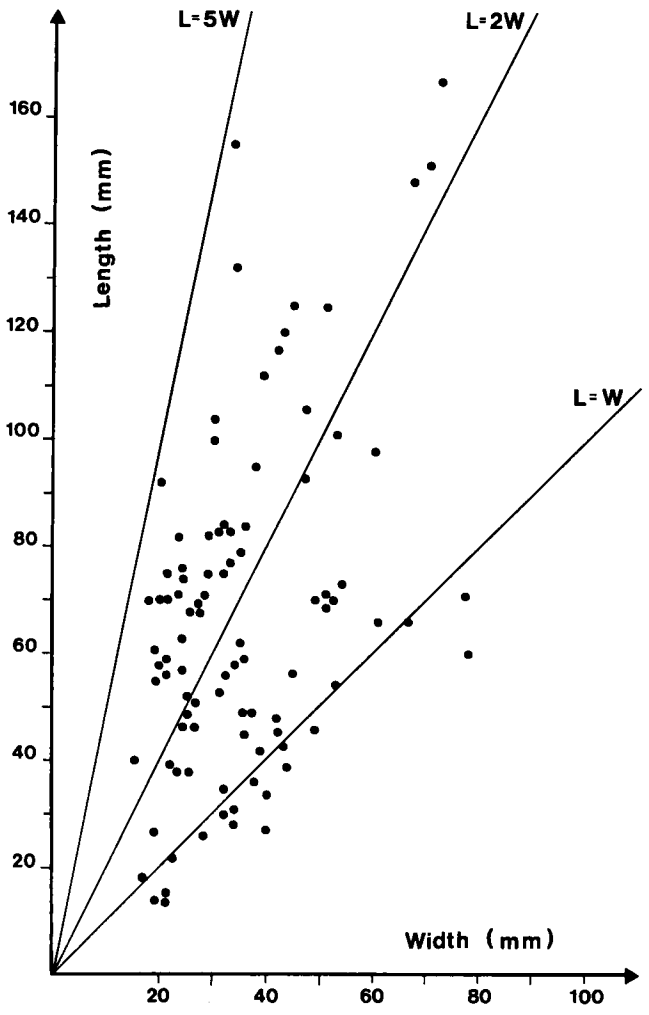


Fig. 3. Flaking sequence for one of the bipolar blade cores. Signatures, etc., as in fig. 2. The first flakes from the working of the core are absent from the refitted sequence, but probably the larger part of them are actually present in the shape of another refitted unit with 10 members. To judge by the small quantity of flint which remained afterwards, the present knapping sequence must represent the production stages immediately before the core was discarded.

Flaking of this core is characterized by a cyclically repeated process comprising platform formation, preparation and blade detachment. This process is to some extent supplemented by detachment of strong, longitudinal flakes, serving to adjust the shape of the blade front. The cyclically repeated process was carried out alternately at both ends of the block. The frequently rejuvenated platforms at each end were on each occasion placed approximately parallel to each other and at right-angles to the direction of blade detachment. NB! Preparation may not be attested in cases where the associated longitudinal flakes are absent.



	Number of analysed flakes	Number og determinable flakes	Frequency of "soft flakes"
Egtved	107	94	2%
Hammer-stone of quartzite	39	30	0%
Hammer-stone of limestone	39	33	3%
Fabricator of red deer antler tip	15	14	43%
Club of red deer antler base	49	40	48%
Fabricator of red deer antler tip	82	79	53%
Fabricator of red deer antler tip	22	22	55%

Table I. Frequency of "soft" flakes in the Egtved find and in a series of experimental blade productions. Each of the experimental assemblages comprises flakes larger than 2.5 cm detached from a blade core of Senonian flint by means of the flaking tool indicated. Flakes in "soft technique" are defined by: 1) the presence of a projecting "lip" all along the edge between the platform remnant and the ventral surface, and 2) the absence of any incipient cone on the platform remnant.

Fig. 4. The length-width ratio of all extant flakes – including fragments, where at least 4/5 of the original length is judged to be present. The length has been measured from the point of percussion to the farthest point on the ventral surface. The width is greatest width parallel to the platform remnant. The circles in fig. 5–8 represent a gradually reduced proportion of the population shown here.

PRODUCTION METHODS

Although the find material does not include any kind of flaking tool, it can be established with great certainty that all the work has been carried out with a hammer-stone alone. This is apparent from the high frequency of pronounced percussion bulbs, eraillure scars, completely or partially collapsed platforms and striking-scars around the detachment point (see fig. 9 and 11). The presence of 2 flakes with a pronounced "lip" – a feature that often accompanies flaking with a soft instrument – does not alter this conclusion. The phenomenon also occurs experimentally when a hammer-stone is used (cf. table 1).

On the basis of the refitting it can be established that the working of each core has followed a fixed schema with cyclic repetition of the three procedures: first formation of a platform, then retouching ("preparation") of the new platform and finally flaking along the front.

The characteristic working procedure is exemplified in fig. 2 and 3, which comprise the refitted flakes as well as those known only from their negatives. It is apparent from these two examples that it has occasionally been necessary to interrupt the ideal procedure in order to adjust the shape of the blade core. Such adjustments were carried out with one or a few blows from the distal end or from the side of the blade front.

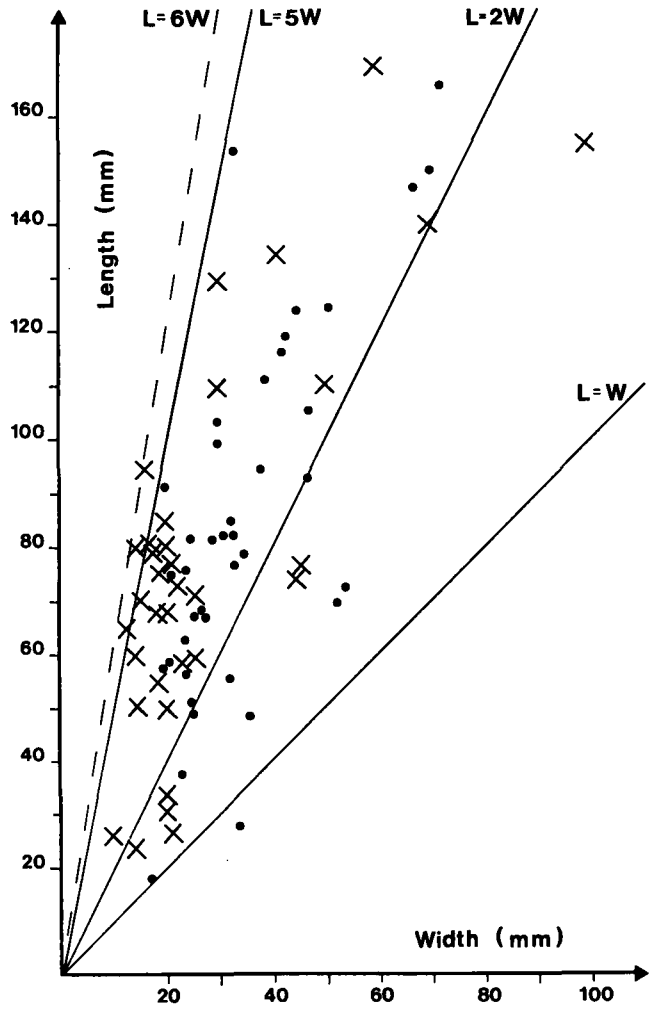


Fig. 5. Longitudinal flakes from the 9 best known refitted units (with the largest number of flakes).
Circles: extant flakes. Crosses: phantom flakes with precisely or approximately known dimensions and with a length exceeding 2 cm.

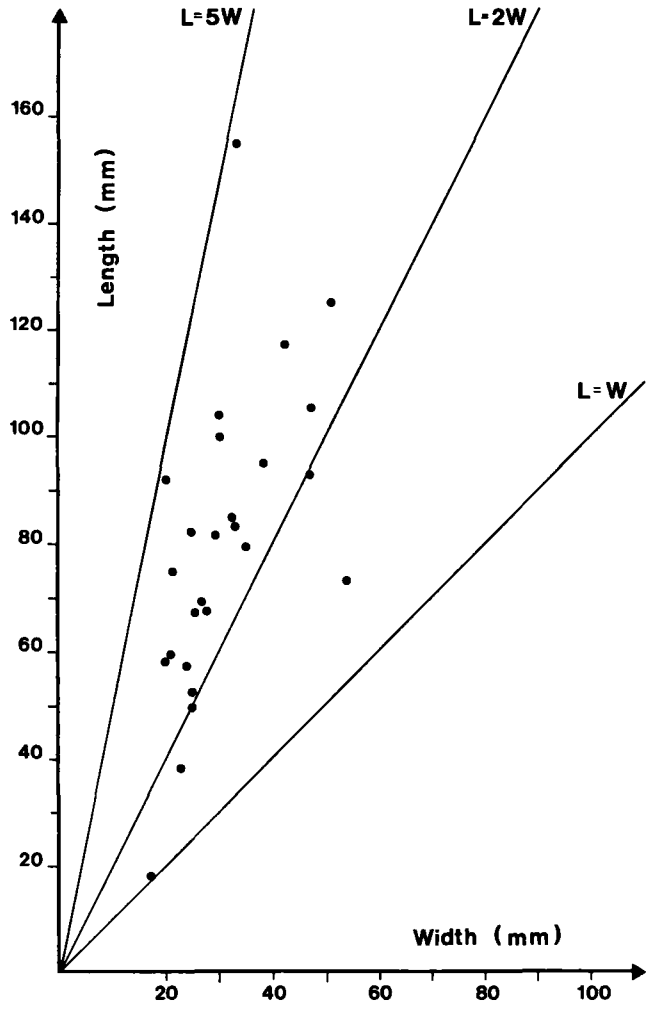


Fig. 6. Longitudinal flakes with less than 10% cortex, thus excluding flakes detached primarily to remove the cortex from the front of the core.

THE IDEAL PRODUCT

Refitting has given the impression that it is particularly the most successful blades which are absent from the inventory. This impression can be further supported by comparing the length-width proportions of the extant and absent flakes, respectively. Before this occurs, it should be remarked that a comparison of this kind is hampered somewhat by the fact that whereas it is often possible to establish the maximum width of the missing flakes, the full length is seldom known. As the proportions in the following are calculated from the known lengths and breadths, the lacking flakes ("phantom flakes") may in some cases appear less slender than they in fact were.

If all present and absent flakes from the two flaking sequences shown in figures 2 and 3 are ranked according to slenderness, a striking result is obtained. It turns out that it is primarily the most slender specimens that are lacking. From the unipolar core, rank positions 1, 3, 4 and 12 of a total of 15 are missing. From the bipolar core, positions 1, 2, 4 and 13 of a total of 23 flakes of known dimensions are absent.

Corresponding conditions apply to the other refitted

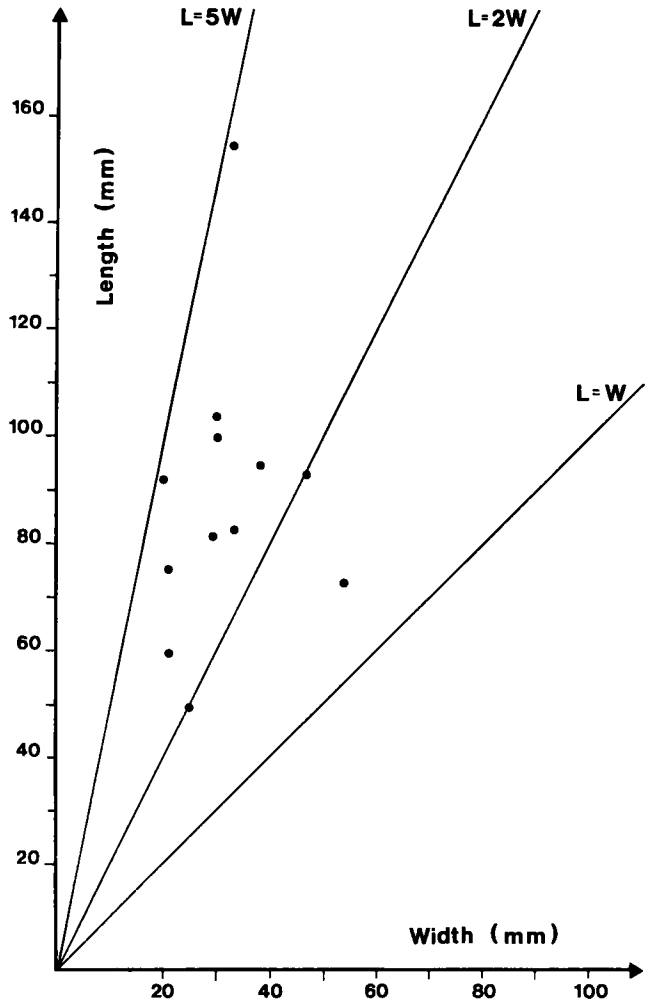


Fig. 7. Longitudinal flakes with less than 10% cortex and with primary preparation. The population represents flakes which the flint-knapper has carefully prepared by the shaping of a smoothly retouched platform right above a longitudinal ridge which could guide flaking in a straight line down to the tip of the core.

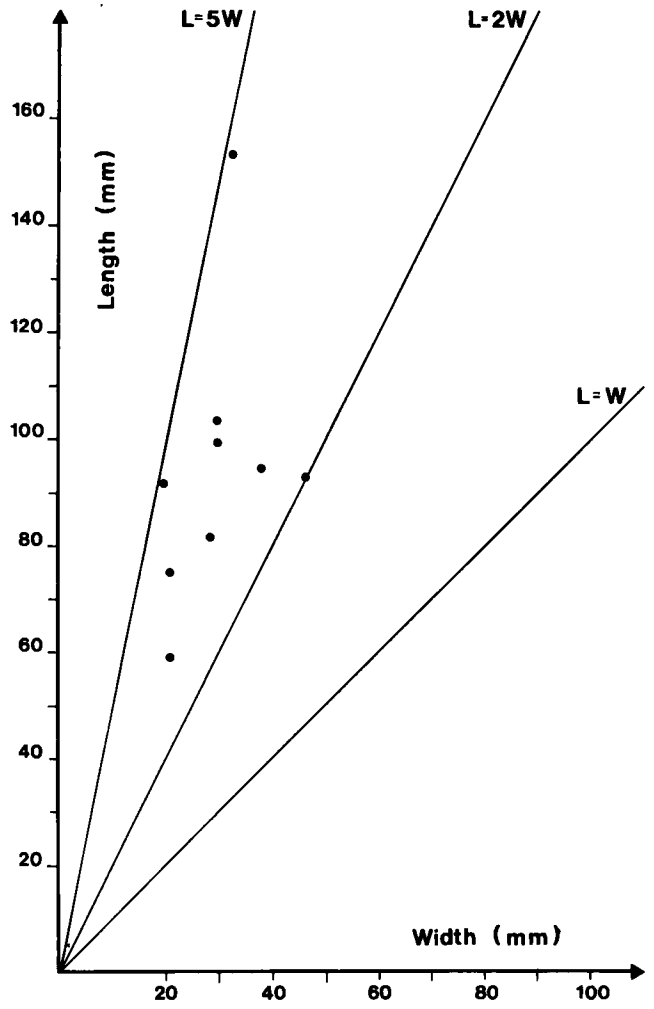


Fig. 8. Longitudinal flakes with less than 10% cortex, with primary preparation and with more or less feather-shaped ("feather-terminating") distal ends. The population comprises the carefully prepared and reasonably successful flakes approximating the desired product.

units – the slenderest flakes, which are also often among the very longest (cf. fig. 5) and most regularly formed, are remarkably often absent. In those cases where high-ranking flakes nevertheless are present, conditions can in each case be demonstrated which suggest that the flint-knapper did not consider these blades to be quite successful (cf. fig. 9).

There is thus much to suggest that the desired product is systematically missing from the preserved material. If one should attempt to give a description of the product itself, it has to be done indirectly by adducing the waste products which come closest to the ideal. This can be carried out in a simple manner by exploiting knowledge of the flaking process achieved with the aid of the refitting. Those flakes which combine the following four clear and easily perceived properties are selected:

1) The flake must be detached along the length of the core.
2) Less than 10% of the flake must be covered by cortex.
3) The platform remnant must have primary preparation, i.e. the fine retouch of the platform must

depart from the edge of the flake's platform remnant.

4) The flaking trajectory must be successful, which in this connection means a) that the cleavage surface should not curve inwards to the degree that it removes the core tip and runs onto the other side of the core ("outre passé"), and b) that it must not curve outwards more than 90° and thus become visible on the dorsal side of the flake ("hinge-terminating").

The result of such a selection is shown graphically in fig. 4 to 8. It is apparent from this that the final "distillate" is characterized by the following lower limits for dimensions and proportions:

- length ≥ 60 mm
- width ≥ 20 mm
- length ≥ 2 × width

If the phantom flakes whose dimensions can be established from their negatives are included (fig. 5), it is further possible to give some upper limits for the size and shape of the desired product. It seems to be definable with the following dimensions and proportions:

- 60 mm ≤ length ≤ 170 mm
- 2 × width ≤ length ≤ 6 × width.

Of the present flakes from the 9 refitted units with the most flakes there are only 9 examples which live up to the four criteria for the "ideal blade". They are all shown in fig. 9. It appears from the figure that it is a matter of thin and at least partially sharp-edged blades. It is also seen that the majority tend towards having hinge-terminated ventral surfaces. They are thus to a certain extent unsuccessful, because they did not utilize the full length of the core. Only fig. 9b, 9d, 9f-g and 9j, utilized the length of the core fully. On the other hand, the long edges of 9b, 9f and 9g are so irregular that the blades are unfit for cutting. The somewhat more regularly shaped flake 9j has been disqualified beforehand, having broken at the moment of detachment.

Several of the 9 blades could undoubtedly have served as blanks for burins or scrapers, but as knives they would be second grade.

The prime quality specimens must be found among the missing flakes, of which at least 21 fall within the just given description of the dimensions and proportions of the desired product.

In summary, it can be established that the desired product has been characterized by the following properties:

- greath absolute length
- great length relative to width and thickness
- straight, sharp edges.

Such properties would have been especially desirable if there was a need for long clean cuts. In the Palaeolithic such a function can hardly have occurred in other connections than in the skinning and dismemberment of big game.

DATING

The find site (fig. 13) lies within the area that was covered by Weichelian inland ice. The concentrated find distribution must therefore be taken as expressing that the flint inventory has been left at the site after the inland ice disappeared, and the objects be of Late Glacial or perhaps Post-Glacial origin.

If the find circumstances and the objects themselves are examined more closely, the dating can be further narrowed. The position of the objects – more or less vertical – in the subsoil sand can thus best be regarded as the result of late glacial cryoturbation of the soil. The slightly lustrous surface of the flints likewise suggests that the inventory has been subjected to periglacial cryoturbation. Corresponding surface changes have thus been observed in many Late Glacial flint inventories from the South Scandinavian area (see, for example, Madsen 1983: 21 and Fischer et al. 1984: 36). The clearest sign of the material's Late Glacial origin is, however, the presence of secondary frost cracks (fig. 10b). Corresponding frost fissuring, incurred after the knapping, has namely been observed in numerous indisputably Late Glacial inventories from South Scandinavia (e.g. Trollesgave, see Fischer et al. 1979 fig. 14), but never in purely Post-Glacial finds.

An attempt at closer dating within the Late Palaeolithic poses a number of problems, because the cultures or technocomplexes of this era are defined on the basis of types of retouched implements. Nonetheless, it should be possible to go some of the way. There are at least quite evident differences in flint technology within the four archaeological culture groups into which the Late Palaoeolithic find material of South Scandinavia is traditionally divided, viz. Hamburg, Federmesser,

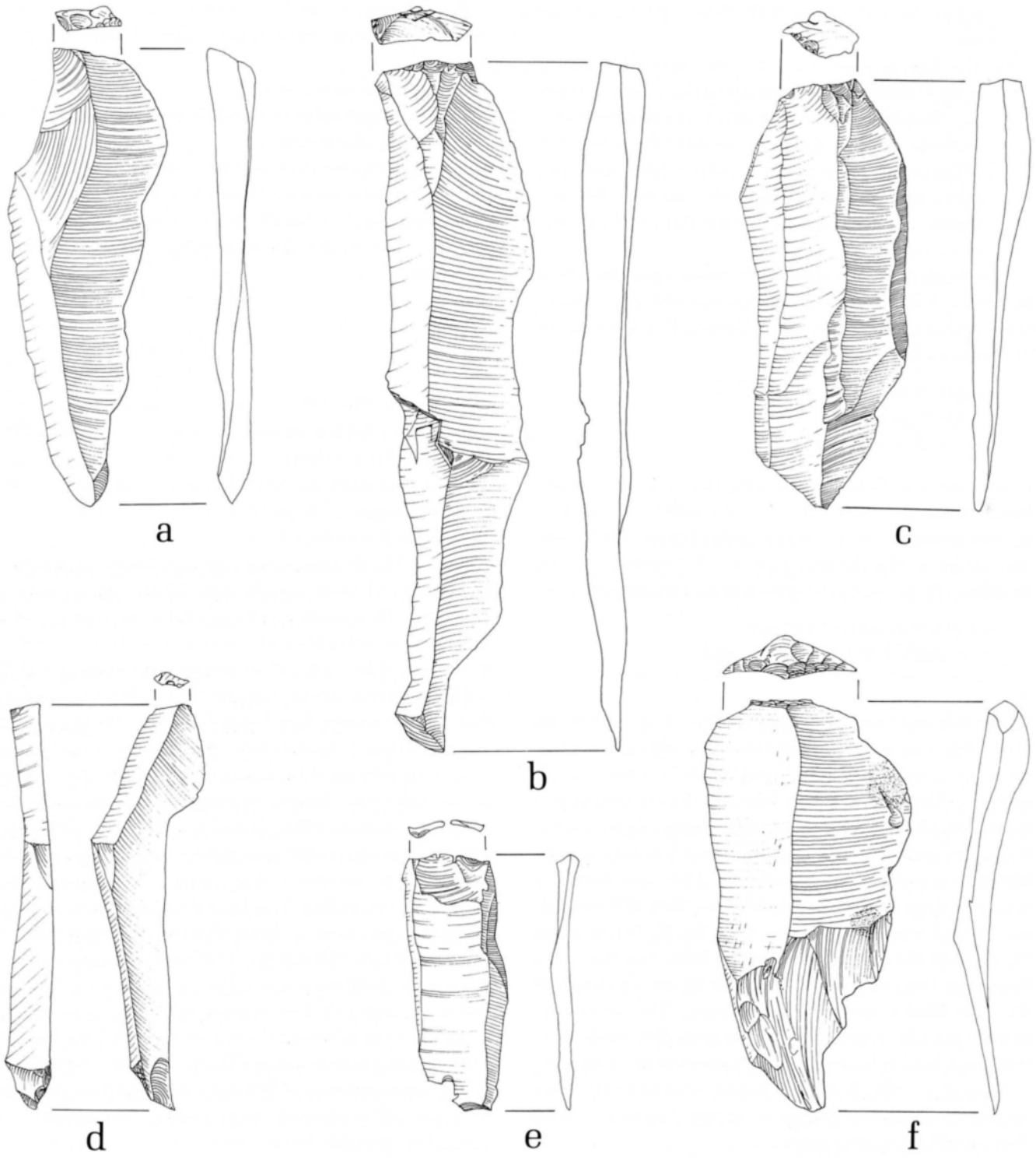
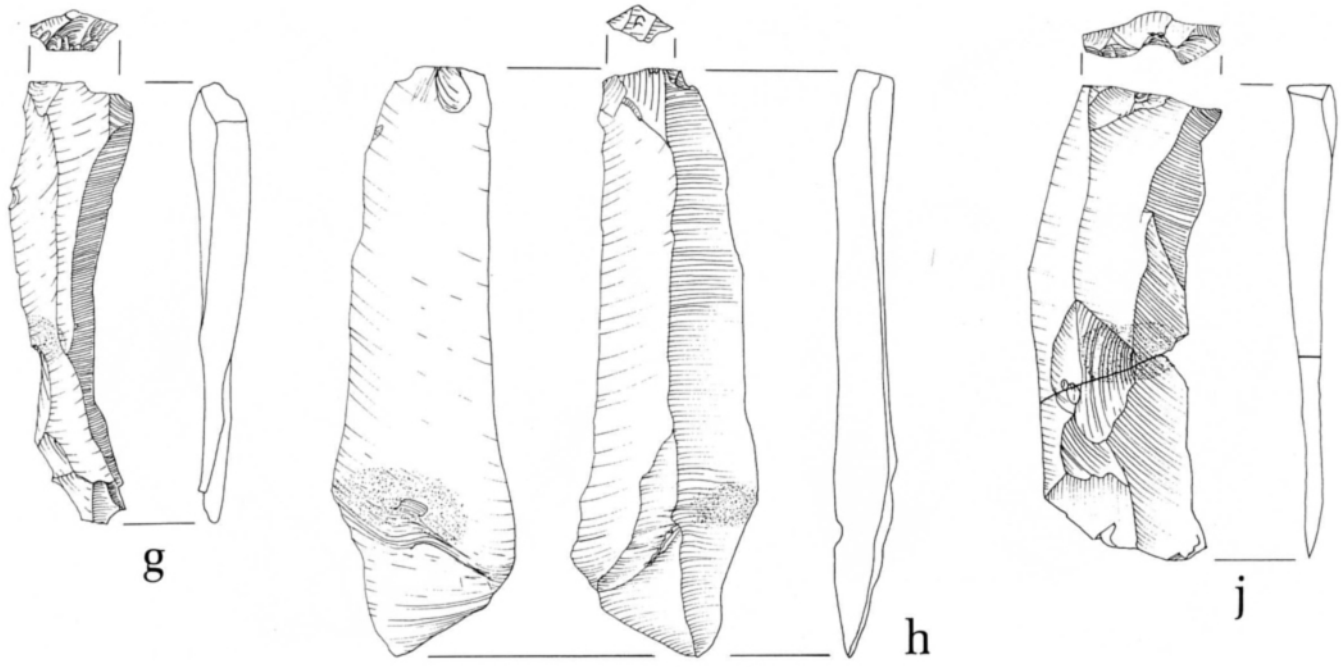


Fig. 9. Approaches to the Egtved flint-knapper's ideal blade – the final result of the selection process reproduced in fig. 4–8. All 9 flakes are relatively thin and have sharp edges. None of them can be called perfect, however. Excurrent and irregular flaking has thus caused them to be relatively short or their edges to be uneven. 3:4. Drawing: Kurt Petersen, 1988.



Bromme and Ahrensburg cultures (see for example Bokelmann 1978 and 1983, Fischer 1978: 45, 1982: 92–93 and in press B, Fischer et al. 1979: 11f., Madsen 1983: 23–25 and not least Hartz in press).

If one should attempt to refer the Egtved flint to a particular cultural epoch, it must primarily be done on the basis of the flaking technique alone, because the dimensions and proportions of the debitage are probably to too great an extent determined by local not culture-specific variations in the supply of raw materials. In a just completed work, Sönke Hartz (in press) enumerates a series of flint-technical characteristics for the four culture groups mentioned above. If the Egtved inventory is compared with these non-quantitative characteristics, there can hardly be any doubt as to where the find belongs. It can be characterized by the following features:

- detachment entirely in hard technique
- frequent occurrence of facetted and finely retouched ("prepared") platform remnants
- almost total lack of fine retouch from the platforms down the flaking fronts ("trimming")
- unipolar blade cores of conical form and bipolar cores with approximately parallel platforms and blade detachment along most of the perimeter of the cores.

The inventory hereby falls within the variation range of the Federmesser culture, while in several respects it falls outside the flint-technological spectra of the other cultures.

With respect to the hardness of the flaking implements, the Egtved flint clearly deviates from inventories which indisputably belong to the Hamburg and Ahrensburg cultures (fig. 12). This can in theory be due to the Egtved find representing an atypical situation, where the flint-knapper did not have soft fabricators (antler) at hand, and therefore had to make do with locally available stones. But such a hypothesis claiming that in reality we are confronted by a "disguised" Hamburgian or Ahrensburgian flint-knapper runs into other difficulties. One must namely in this case also assume that the flint-knapper quite exceptionally forgot the systematic trimming of the core edges, and that that he did not as usual work with bipolar cores with striking platforms laid obliquely to each other and with blade flaking along a limited part of the core side. Altogether it should thus be possible to rule out that the Egtved inventory originated in the Hamburg or Ahrensburg cultures.

Although the Egtved flint in respect of percussion bulb characteristics is close to the inventories of the Bromme culture, it seems nonetheless possible to rule out descent from this. At least the preparation of plat-

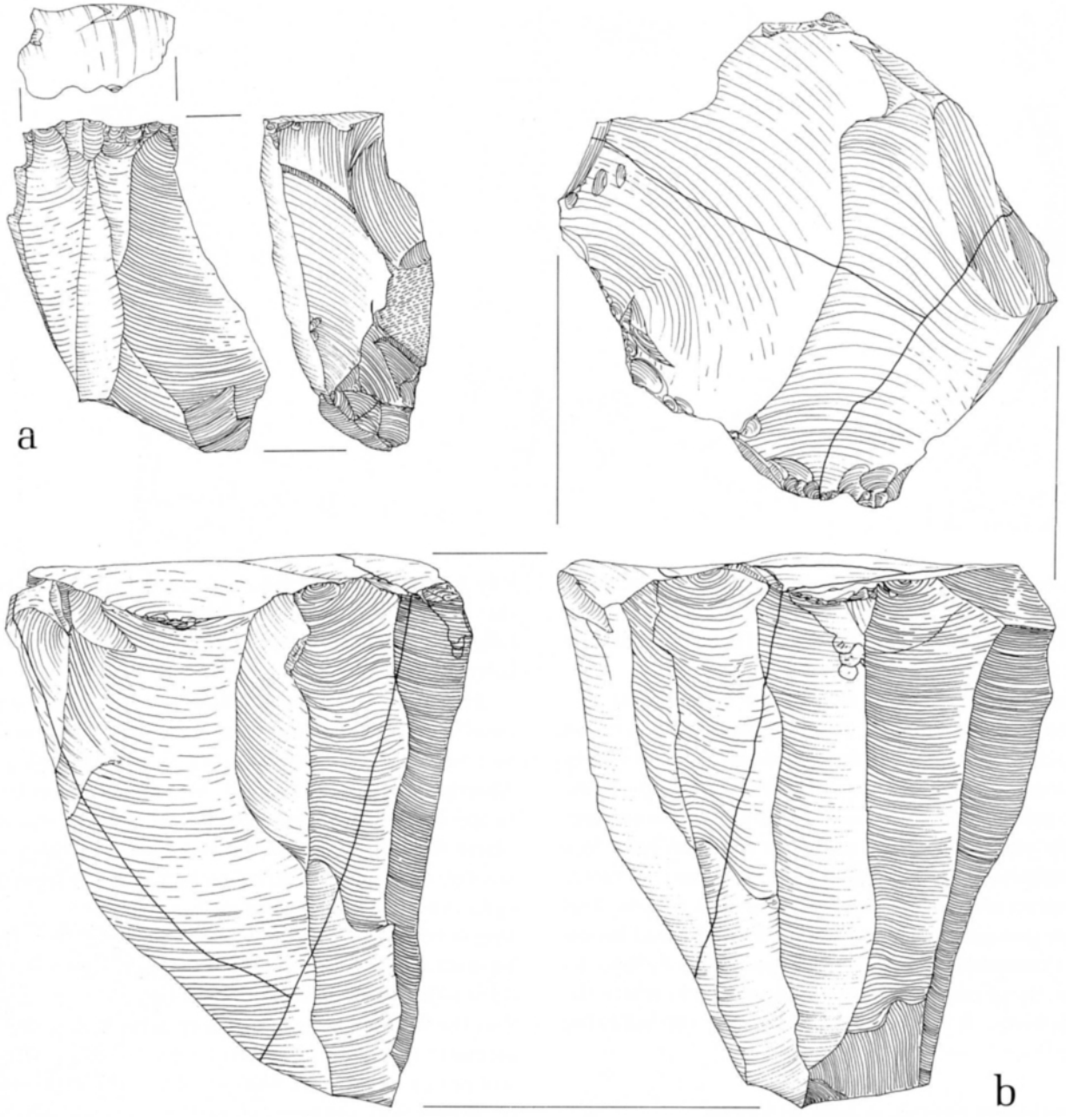


Fig. 10. a: Fully utilized blade core, part of a refitted unit with 10 flakes. In the course of the flaking sequence, the length of the block has been reduced from 15 to 7 cm by means of repeated platform rejuvenation.

b: Core with facetted platform and traces of fine retouching of the platform edge (preparation). Working has stopped after detachment of a few blades and after three unsuccessful attempts at platform rejuvenation. The thick strokes indicate frost fissures incurred after working. 3:4. Drawing: Kurt Petersen, 1988.

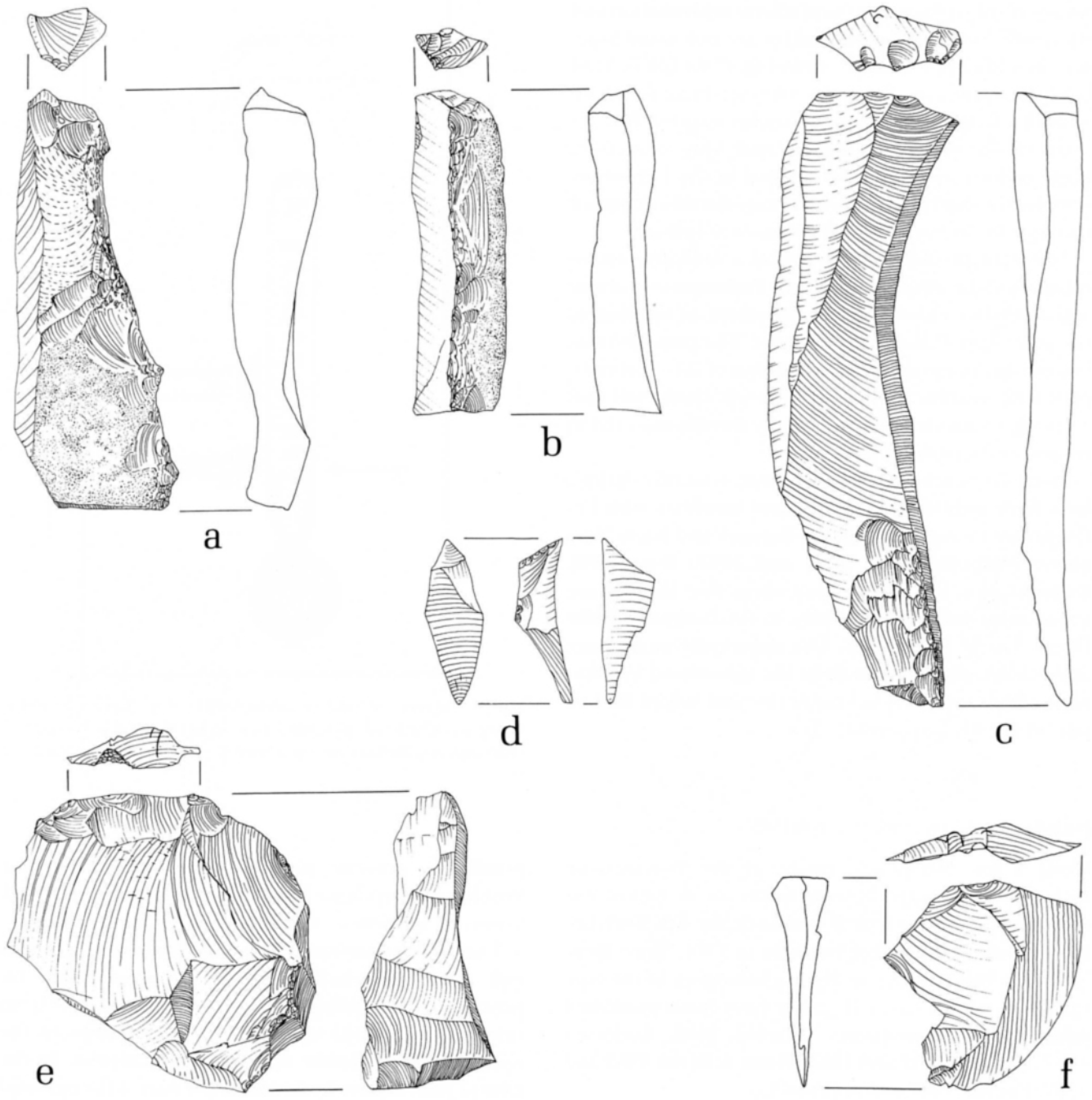


Fig. 11. Selection of flakes with special knapping characteristics. a: Guide ridge dressed from two sides ("crested blade"). b: Through-going guide ridge, unilaterally dressed. c: Partial guide ridge dressed from one side. d: Triangular flake – a bye-product of flaking in "hard technique"; it comprises parts of the platform edge and has no true percussion bulb. e–f: Platform rejuvenation flakes. 3:4. Drawing: Kurt Petersen, 1988.

forms does not belong to the characteristic blade technology of this culture, just as platform rejuvenation and bilaterally retouched guide ridges are not usual practice. In addition, thorough trimming of the blade front is a quite consistent feature in all hitherto analysed inventories from this culture (cf. Fischer in press B).

Based on the characteristic and very consistent blade-making technique manifested in the Egtved inventory, this find can thus with a considerable degree of certainty be referred to the Federmesser culture.

The available data do not permit a definitive establishment of the absolute age of the Federmesser culture and a relative chronological placement in relation to the other Late Palaeolithic cultures. The principal reason for this is the marked association of this find complex with localities with well-drained sandy soil and consequent paucity of scientifically datable material in secure stratigraphical position.

From the South Scandinavian area, scientific datings have been published for only three localities with Federmesser inventories: Rissen, Borneck and Klein Nordende (Schwabedissen 1954 and 1957, Rust 1958, Bokelmann et al. 1983). They show that the culture group must belong somewhere in the interval Middle Dryas – early Late Dryas. The apparently most exact and reliable dates derive from the last-named locality, whose finds evidently belong to the time before the last part of the Allerød period.

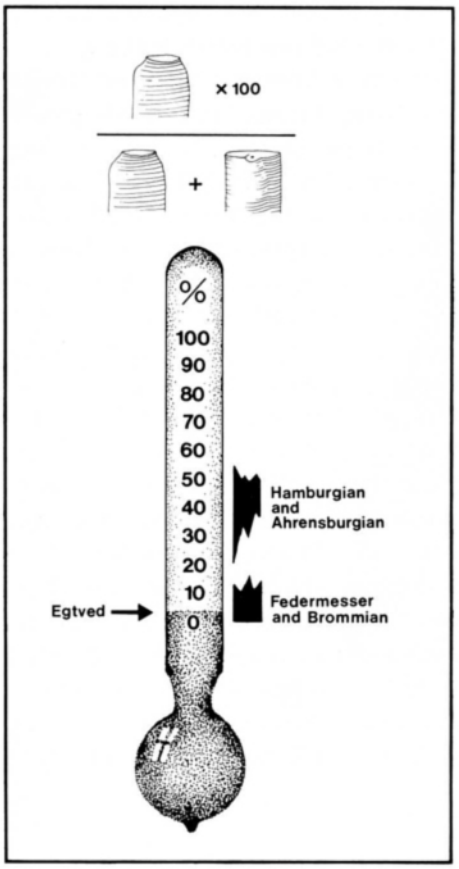


Fig. 12. Frequency of flakes in "soft technique" in the Egtved find and in inventaries which can be unambiguously referred to one of the four archaeological cultures occurring in South Scandinavian Late Palaeolithic (2).

FEDERMESSER CULTURE IN DENMARK

Until a few years ago, traces of the Federmesser technocomplex were a quite unknown or rather unrecognized phenomenon in Denmark, the first finds being published by B. Fugl Petersen in 1974. Since then, summary information on objects belonging to the type spectrum of the cultural group have been published with increasing frequency (Fischer 1976, Andersen 1977, Madsen 1982 and 1983, Holm & Rieck 1983 and 1987, Fischer 1987 and in press A).

By far the majority of Danish finds of the Federmesser culture's characteristic artefact types stem from localities that have also yielded other Late Palaeolithic material (cf. fig. 13). This applies, for instance, to the locality Jels I, which in addition to a gravette point and a few Wehlen scrapers have also furnished objects from the Hamburg culture (Holm & Rieck 1987). Correspondingly, gravette points, "Federmessers" and/or Wehlen scrapers have been found with Bromme points at several localities – e.g. Rundebakke (fig. 13 & 14).

The find circumstances at all these sites make it difficult to decide whether the Federmesser aspect represents an independent phase of occupation or is an integral part of the material from occupation in the epochs of the Bromme and Hamburg cultures. In the case of Jels I, where by far the larger part of the material derives from disturbed layers, the connection is doubtful, since the Wehlen scrapers are made from much coarser flakes than the other scrapers of more normal Hamburg character (hard versus soft flaking technique?; cf. Hartz in press). The Løvenholm find's combination of Wehlen scrapers and Bromme points (Madsen 1983) is in this respect far more convincing, all the

scrapers being of the same type and all the material being based on hard percussion technique.

The Løvenholm inventory must on the basis of its flint points (tanged points with partly preserved platform remnant) be assigned to an early part of the Bromme culture (cf. Fischer 1978). The same apparently applies to all the other Danish inventories in which Federmesser types occur with tanged points. It can thus by no means be ruled out that at least some of the Federmesser culture's types in Denmark are an integrated aspect of the early Bromme culture's implement inventory. Purely typologically, the possibility therefore stands that within the Danish or South Scandinavian area a gradual typological and chronological development from the Federmesser to the Bromme culture has occurred. Such an interpretation of the course of events would be in agreement with the few available scientific datings, which place the two cultures in and around the Allerød period – the former rather in the early phases and the latter rather in the later (cf. Fischer & Tauber 1986). The Egtved find with its limited affinities to the known Bromme inventories must in this case be placed in the early part of this developmental sequence.

SUMMARY AND CONCLUSION

The few handfuls of flint debitage from Egtved represent an episode of probably less than one hour, during which a few flint nodules were worked for the sole purpose of producing blades for use elsewhere. The impressions of the removed blades and analyses of those left behind show that the long, thin and narrow blades with the straightest and sharpest edges were carefully selected. Flakes with these properties are especially suitable in situations where there is a need for long, clean cuts, which in a Late Palaeolithic context probably must be in the skinning and dismemberment of big game.

The flint waste left behind reflects a very characteristic and consistently performed flaking procedure, which within the South Scandinavian area is known only from the Federmesser culture. This sets the scene for the flint-knapping episode at Egtved. It was probably played out in the open landscape of the early Allerød period, when hunters of big game could encounter reindeer, elk and giant deer (Aaris-Sørensen 1988).

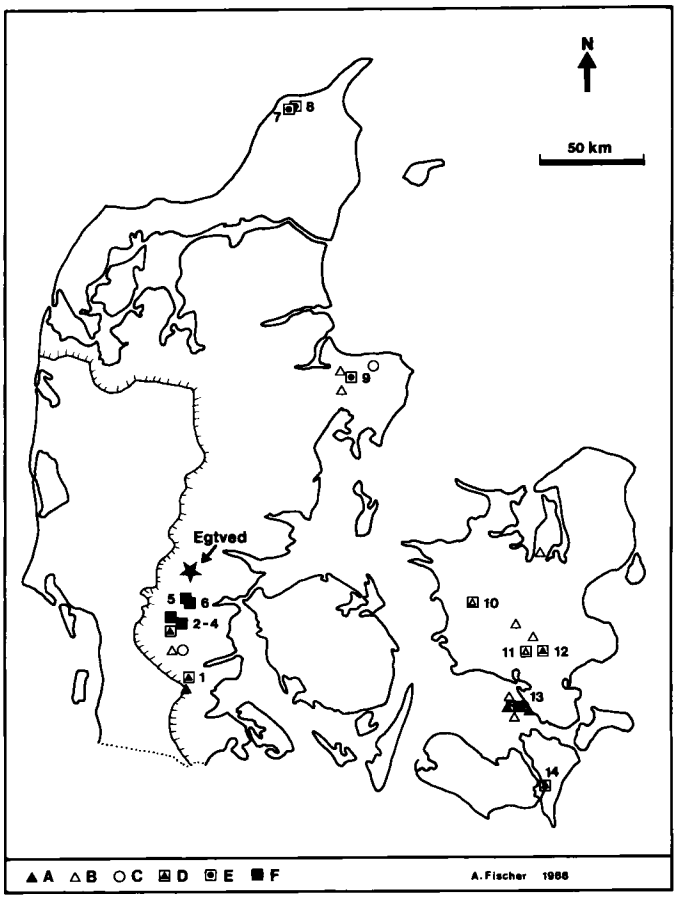


Fig. 13. Maximum extent of Weichselian glaciation and finds of Federmesser culture in Denmark – both the Egtved flint assemblage and finds of retouched flint implements of types considered to be characteristic of the culture.

A Stray find of definite Federmesser or gravette point
B Stray find of possible Federmesser or gravette point
C Stray find of possible Wehlen scraper
D Settlement inventory with Federmesser(s), gravette point(s), or the like
E Settlement inventory with Wehlen scraper(s)
F Settlement inventory with Wehlen scraper(s) and Federmesser(s) or gravette point(s).

1: Hjarup Mose (Andersen 1978). 2–4: Jels I and II and Jels Oversø (Holm & Rieck 1987). 5–6: Sølyst et al. 7–8: Ramsgaard et al. (Nilsson in prep.). 9: Løvenholm (Madsen 1983). 10: Rørmose. 11: Fensmark Skydebane. 12: Stoksbjerg Vest. 13: Rundebakke. 14: Hasselø (Vemming Hansen 1988).

The finding place lies in a slightly undulating, sandy moraine landscape without marked topographical features within the nearest hundreds of metres. In this respect it differs from the main part of the Late Palaeolithic sites in Denmark, which lie either directly by lake basins of that time (base camps?) or at the foot of hills

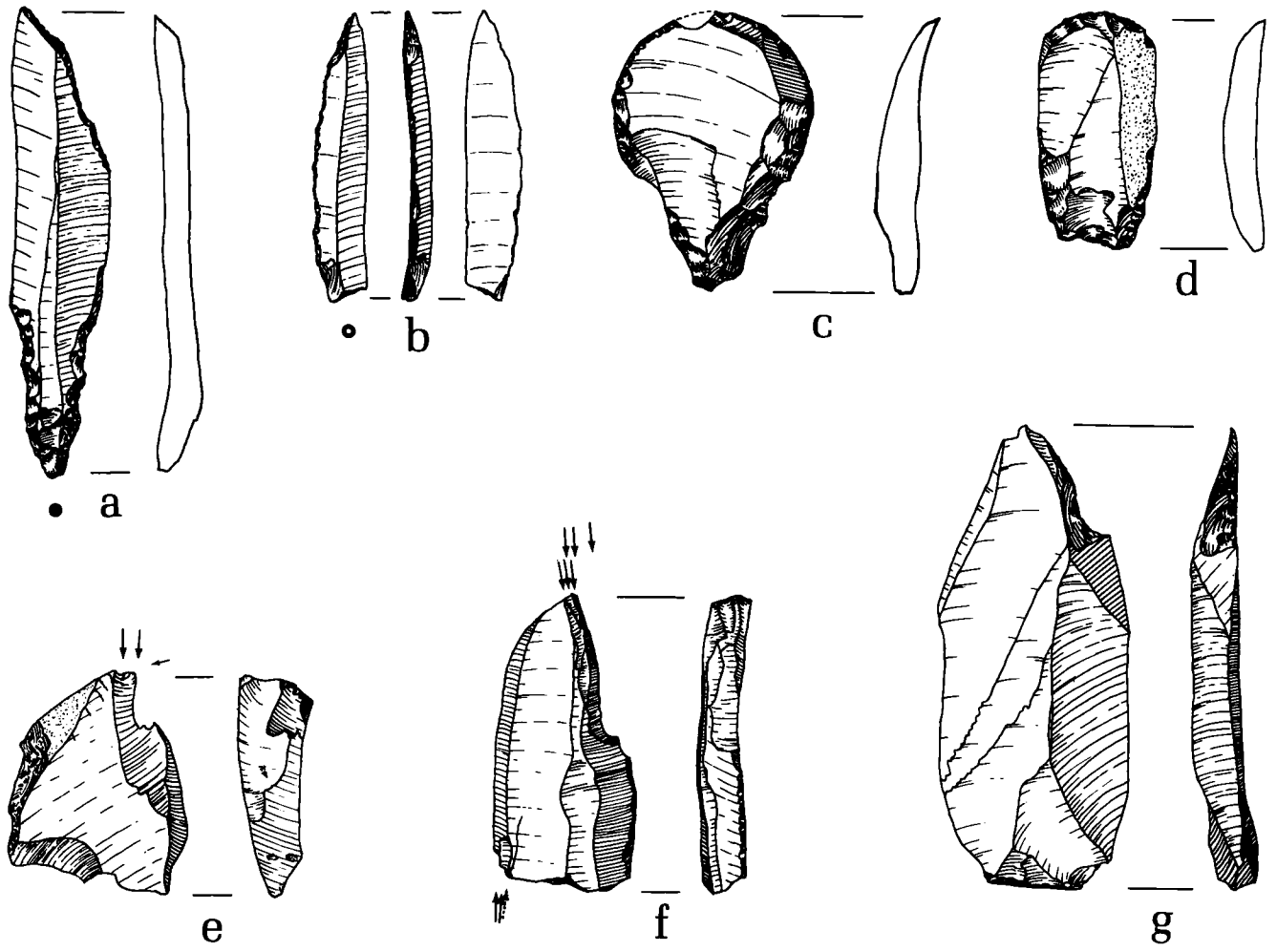


Fig. 14. Surface finds from the settlement of Rundebakke. The inventory comprises types diagnostic of both the Federmesser and the Bromme technocomplexes. a: Tanged point of Bromme type. b: Federmesser with obliquely retouched base. c–d: Scrapers with lateral edge retouch. e–f: Burins. g: Flake with oblique retouch. 3:4. Drawing: A. Fischer, 1976.

from which there is a good view (hunting stands?) (Fischer 1987 and in press A). Purely topographically, the site thus appears to have been chosen quite at random and is rather associated with a specific hunting situation where a big game animal was to be skinned and dismembered in order to be carried home.

The Egtved flint is one of the most modest archaeological finds from Denmark, and a whole combination of fortunate circumstances was required before it became a part of the culture-historical source material. Furthermore, substantial refitting and analysis had to be carried out before the material could be placed in its correct culture-historical context. As a result, we now have the first glimpse of behaviour and way of life in a hitherto little known and archaeologically almost invisible epoch of the Danish Late Palaeolithic.

Translated by Peter Crabb

Anders Fischer, *Skov- og Naturstyrelsen* (The Forest and Nature Agency), Slotsmarken 13, DK-2970 Hørsholm.

NOTES

1. The project for restoring the Egtved girl's barrow as a tourist attraction was directed by *mag.art.* Lone Hvass, and the excavation of the flint material carried out by *mag.art.* Steen Hvass, both of *Vejle Kulturhistoriske Museum.* They are thanked for permission to investigate and present the Late Palaeolithic bye-product of their Bronze Age excavations. I am also indebted to *Dronning Margrethe II's Arkæologiske Fond* for financial support for the present investigation. Furthermore, I am grateful to *Kalundborg og Omegns Museum* for providing a workplace and administering the project's economy. Finally, *hørepædagog* John Rasmussen is thanked for permission to reproduce his finds from the Rundebakke settlement.

   The Egtved flint site is registered in the culture-historical central register as no. 110; Egtved sogn, Jerslev herred, Vejle amt.
2. Fig. 12 collates the results of a series of analyses of percussion bulb characteristics in Late Palaeolithic inventories from Sweden, Denmark and Schleswig-Holstein. They have been carried out on blades and flake tools. As far as the Hamburg culture is concerned, it is a question of the industries from Borneck, Jels I and II, and the lower culture layer at Stellmoor. The Federmesser culture is represented by Borneck West, Borneck Mitte, Rissen 14 and 18, Kampen and Wehlen. From the Bromme culture, inventories have been analysed from among other places Bromme, Segebro, Trollesgave and Fensmark Skydebane, whilst the Ahrensburg culture is represented by Stellmoor's upper culture layer, Teltwisch Mitte, Eggstedt, Immenbeck, Risten 14a and Ketzendorf II.

REFERENCES

ALEXANDERSEN, V., P. BENNIKE, L. HVASS & K.-H. S. NIELSEN 1983: Egtvedpigen – nye undersøgelser (Die Egtved-Frau – neue Untersuchungen). *Aarbøger for nordisk Oldkyndighed og Historie* 1981, p. 17–47. Copenhagen.

ANDERSEN, S. H. 1977: En boplads fra ældre stenalder i Hjarup mose. *Nordslesvigske Museer* 4, p. 18–27. Tønder.

BOKELMANN, K. 1978: Ein Federmesser-fundplatz bei Schalkholz, Kreis Dithmarschen. *Offa* Bd. 34, p. 36–54. Neumünster.

BOKELMANN, K., D. HEINRICH & B. MENKE 1983: Fundplätze der Spätglazials am Heinholz-Esinger Moor, Kreis Pinneberg. *Offa* Bd. 40, p. 199–239. Neumünster.

FISCHER, A. 1978: På sporet af overgangen mellem palæoliticum og mesoliticum i Sydskandinavien (Tracing the transition from the Palaeolithic to the Mesolithic in Southern Scandinavia). *Hikuin* 4, p. 27–50 and 150–153. Højbjerg.

– 1982: Bonderup-bopladsen. Det manglende led mellem dansk palæolitikum og mesolitikum? (The Bonderup Settlement – the Missing Link Between the Danish Palaeolithic and Mesolithic?) *Antikvariske Studier* 5, p. 87–103. Fredningsstyrelsen, Copenhagen.

– 1987: Fortidsminder. In BRØNDHOLDT NIELSEN, M. & L. WILCHE JENSEN (red.): *Havbundsundersøgelser. Råstoffer og fredningsinteresser. Smålandsfarvandet,* p. 15–22. Skov- og Naturstyrelsen. Copenhagen.

– in press A: Late Palaeolithic technocomplexes in Denmark. *Mensch und Umwelt in der Allerødzeit.* Symposium 13.–18.05.85.

– in press B: On being a pupil of a flintknapper of 11000 years ago. A preliminary analysis of settlement organization and flint technology based on conjoined flint artifacts from the Trollesgave site. In Arts, N., E. Cziesla & D. Winter (eds.): *The Big Puzzle. International Symposium on Refitting Stone Artifacts. British Archaeological Reports International Series.* Oxford.

FISCHER, A., B. GRØNNOW, J. H. JØNSSON, F. O. NIELSEN & C. PETERSEN 1979: *Stenalder-eksperimenter i Lejre. Bopladsernes indretning* (Stone Age Experiments in Lejre. Internal Organization of the Settlements). *Working Papers* 8, p. 1–45. The National Museum of Denmark. Copenhagen.

FISCHER, A., P. VEMMING HANSEN & P. RASMUSSEN 1984: Macro and Micro Wear Traces on Lithic Projectile Points. Experimental Results and Prehistoric Examples. *Journal of Danish Archaeology* Vol. 3, p. 19–46. Odense.

FISCHER, A. & H. TAUBER 1986: New C-14 Datings of Late Palaeolithic Cultures from Northwestern Europe. *Journal of Danish Archaeology* Vol. 5, p. 7–13. Copenhagen.

HANSEN, P. VEMMING 1988: Museet Falsters Minder og arkæologien. *Museets Falsters Minder 1913–1988. Et kulturhistorisk Museums udvikling,* p. 69–82. Nykøbing Falster.

HARTZ, S. in press: Neue Spätpaleolithische Fundplätze bei Ahrenshöft, Kreis Nordfriesland. *Offa* Bd. 44. Neumünster.

HOLM, J. & F. RIECK 1983: Jels I – the First Danish Site of the Hamburgian Culture. A Preliminary Report. *Journal of Danish Archaeology* Vol. 2, p. 7–11. Odense.

HOLM, J. & F. RIECK 1987: Die Hamburger Kultur in Dänemark. *Archäologisches Korrespondenzblatt* 17, Heft 2, p. 151–165. Mainz.

MADSEN, B. 1982: »De ældste fund«. *Historisk Aarbog fra Randers Amt* 1982, p. 5–15. Randers.

– 1983: New Evidence of Late Palaeolithic Settlement in East Jutland. *Journal of Danish Archaeology* Vol. 2, p. 12–31. Odense.

NILSSON, T. in prep: Jagtpladser fra senistiden i Vendsyssel. *Vendsyssel Årbog* 1988. Historisk Samfund for Hjørring Amt.

PETERSEN, B. FUGL 1974: Senpalæolitiske flækkespidser fra Knudshoved Odde, Sydsjælland (Spätpäolithische Klingenspitzen von der Landzunge Knudshoved Odde, Südzeeland). *Aarbøger for nordisk Oldkyndighed og Historie* 1973, p. 211–216. Copenhagen.

AARIS-SØRENSEN, K. 1988: *Danmarks forhistoriske dyreverden. Fra istid til vikingetid.* Gyldendal. Copenhagen.