A *FEDERMESSER* SITE WITH TANGED POINTS AT NORGERVAART, PROVINCE OF DRENTHE (NETHERLANDS)

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I. INTRODUCTION

The hamlet of Norgervaart (Gem. Norg) lies about 8 kilometres north-west of the town of Assen, the head-quarters of the province of Drenthe (see the map in fig. 1). From the point of view of topography, the surrounding area consists of a plainland with a mean elevation of about 10 metres above sea level. It is occupied by the Older sphagnum-moss peat, the reclamation of which had begun in the first quarter of the present century. Boulder clay, which was laid down by the advancing ice during the Riss glaciation, forms the sub-surface geological formation. It is weathered in the upper parts, and occurs in an unaltered condition within a depth of about one metre. This deposit is overlain by coversands dating from the end of the last glaciation.

The Upper Palaeolithic find-spot, situated about one and a quarter kilometres to the west of the hamlet of Norgervaart, lies at the junction of an agricultural field and a plot of land still covered with heather and peat (fig. 2). The stretch of area housing the site is in the nature of a flat-topped local eminence, or ridge, rising some 2 metres above the general surface level of the region. A small brook called Stokkert, which is a tributary of a larger stream called Lieverder Diep, originates from this elevated area. Another striking geographical feature is formed by the existence of a natural lake called Esmeer not far away from the site. The flints were brought to light in the year 1968 while laying out a ditch (some 100 metres long and 2 metres broad) for drainage purpose. Tjerk Vermaning, a noted amateur archaeologist of the country, visited the spot shortly after the ditch-making operation. He found the artifacts in the dug-out earth consisting of both weathered boulder clay and coversand material. As he later indicated, they were found concentrated in an area of 4 to 5 square metres. While the blade-tool character of the assemblage led him to ascribe it to the Upper Palaeolithic period, the presence of characteristically shaped tanged points made him think of affinities with the Aurignacian culture of France! The collection was purchased by

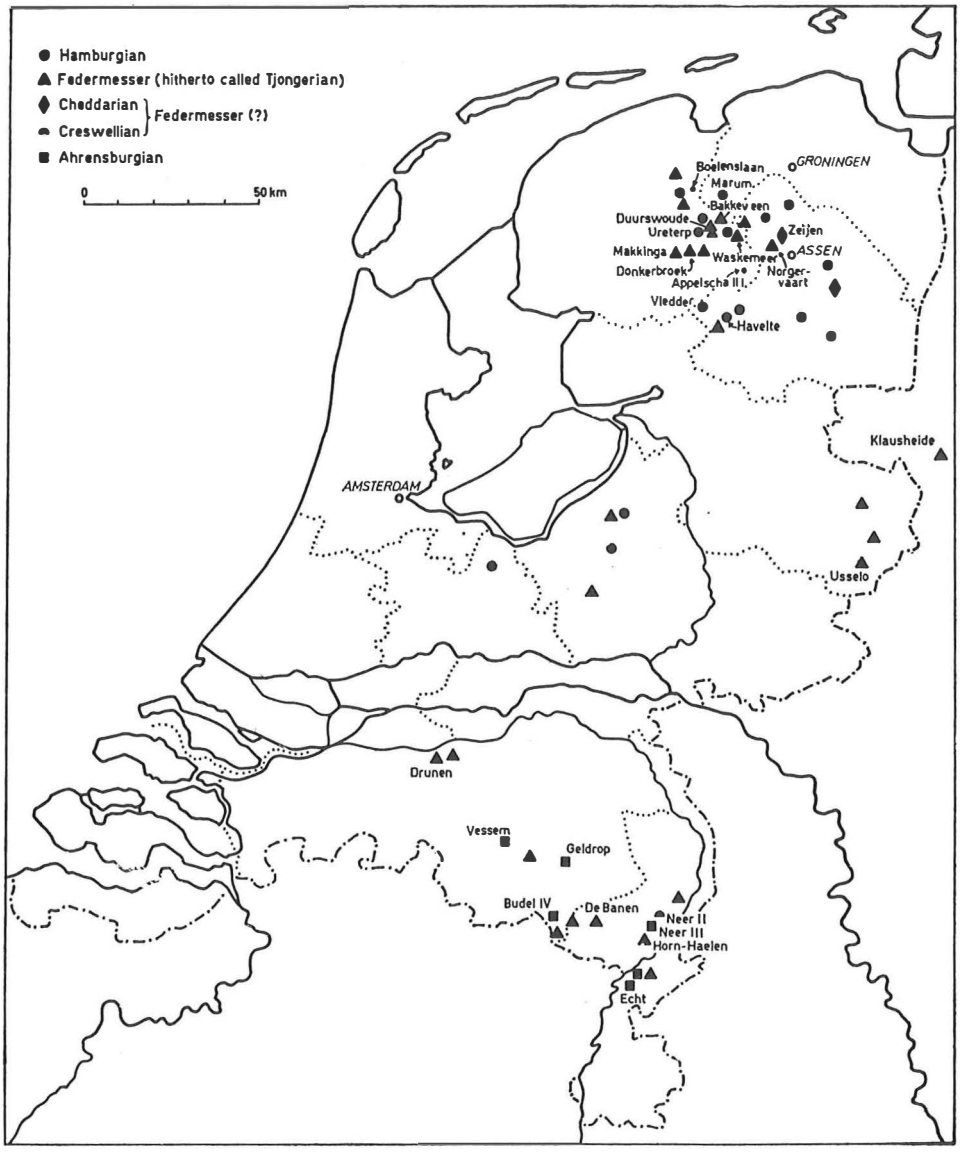

Fig. 1. Map of the Netherlands showing Norgervaart in relation to important Upper Palaeolithic sites.

the Provinciaal Museum van Drenthe at Assen in 1969, and it now forms the property of this body.

With a view to ascertain if any clues could be had about the stratigraphical position of the flints, the site was visited by the writer in August 1970 in the company of Vermaning himself and O. H. Harsema of the Biologisch-Archaeologisch Instituut, Groningen. Upon cleaning one of the main walls of the ditch

referred to above, close to the spot where Vermaning found the artifacts, the following stratigraphical column was observed:

Layers	*Depth below surface (cms.)*
1. Brownish peat	0-28
2. Blackish sand (A1)	28-34
3. Bleached sand (A2)	34-40
4. Illuviated sand (B)-upper part brown and lower part yellow/orange	40-60

Although boulder clay was not reached during this section-making work, the presence of material belonging to this formation in the dug-out earth from the ditch may be taken as proof of its presence below layer 4. From its coarse nature and lack of horizontal stratification, the sand composing layers 2 to 4 would seem to belong to the Younger Coversand formation.

It should be mentioned here that, despite a purposeful search, no artifacts could be found either on surface or in any of the layers exposed in the section. Vermaning who helped making the section, however, stated that he found a number of artifacts at different levels in the illuviated sand layer. It is regrettable that this observation had not been verified immediately, nor Vermaning was careful enough to keep the *in situ* finds separate from those which he found in the dug-out earth from the ditch. Therefore, it is difficult to consider the illuviated sand layer as the cultural horizon; any conclusion in this regard must of necessity await systematic work at the site. For the present the site remains to be in the nature of a surface scatter of flints, and the flint assemblage recovered by Vermaning forms the basis for our study about the cultural affiliations of the site.

II. THE FLINT INDUSTRY

A. General

The assemblage is made up of 391 specimens in all. They are made exclusively on flint, which was in all likelihood obtained in the form of nodules occurring in the local boulder clay deposits. These nodules bear a thin, whitish cortical layer, and are of mottled colours ranging from grey and creamy white to shades of black and brown. The artifacts are as a rule mint-fresh without any signs of abrasion, but a great majority of them show clear traces of patina. The latter feature is consistent with their state of occurrence.

The evidence for on-the-spot knapping is unmistakable. Apart from the

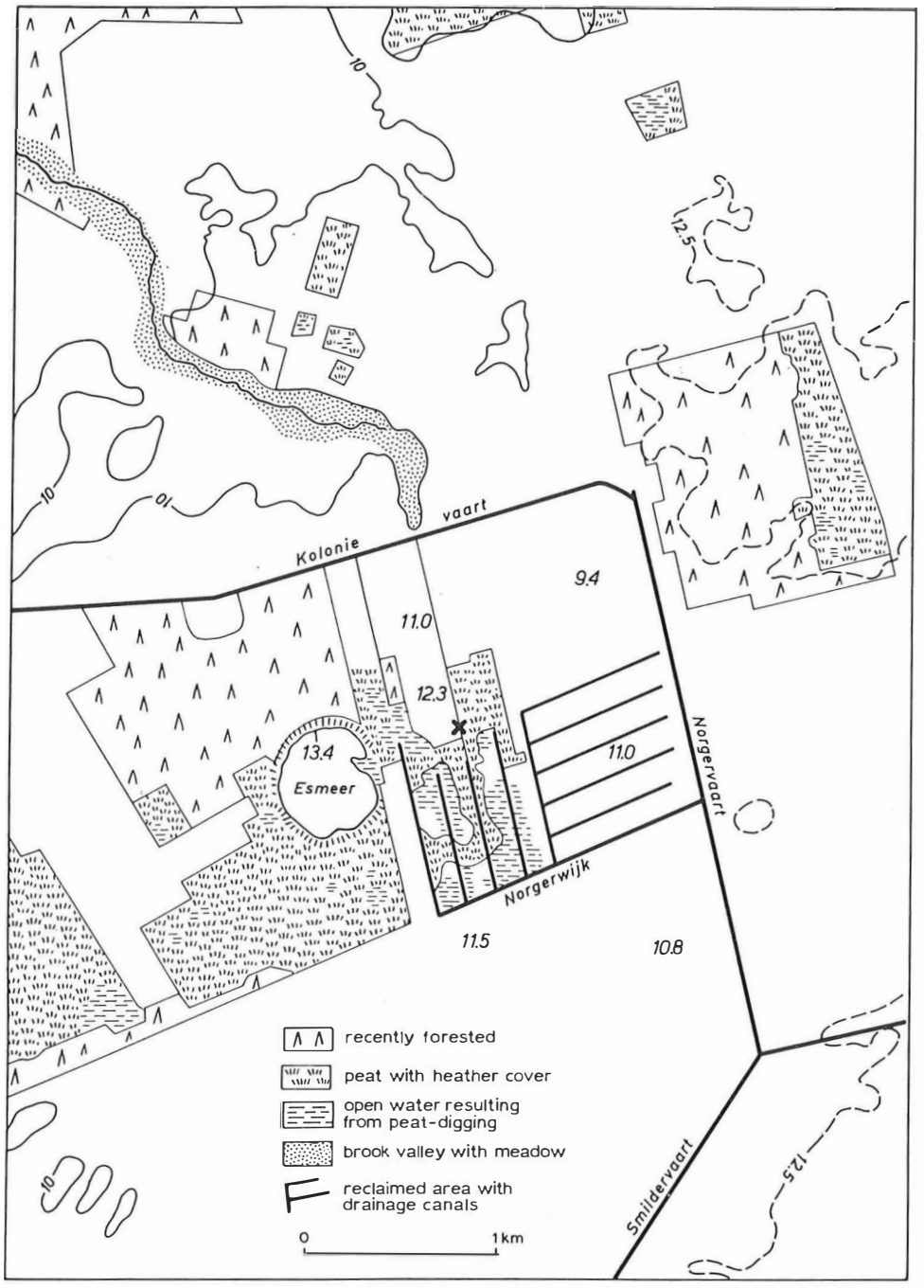

Fig. 2. Norgervaart: Map (oriented North-South) of the immediate area of the Upper Palaeolithic site. The find-spot is marked x.

presence of cores and a large number of unretouched blades, the latter amounting to about 23% of the collection, this is borne out by the high proportion (about 40%) of the by-products of working. They include flakes and flakelets as well as spalls, constituting the debris of primary and secondary forms of flaking respectively. Core rejuvenation flakes, forming the debris derived from the reshaping of cores, supply one other kind of evidence. Finally, we may take note of the presence of a few nodules, the like of which formed the nuclei for working. Although it seems likely that the fractures characterising them are due to frost-action, these pieces nevertheless bear witness to the activity of procuring raw material.

With regard to technology, the assemblage is based mainly on the production of blades. This is attested above all by the exceedingly high proportion of finished implements made on blades. Of the total number of 69 examples, as many as 55 (79%) are fashioned on this category of blanks. In short, the technique consists of removing a series of strip-like pieces from elongated nuclei of columnar form. That the artificer achieved a degree of mastery over the technique could be illustrated with reference to the following three features. First, the preparation of cores prior to the commencement of flaking. The raw nodules are subjected to dressing, so that not only the uneven surfacial features are smoothed off but also the nodules are brought into a form suitable for flaking. This initial dressing involved the removal of shallow flakes both parallel and transverse to the main axis. Nearly half the number of cores have well-made platforms, which are obtained by snapping one or both extremities. They are all formed by single scar-beds and are either flat or somewhat cup-shaped. (None of the specimens shows evidence of true faceting and the few scar-like marks observable in some of the cores seem to be nothing but splinter marks caused during the process of blade removal.) The striking of blades in two directions on one and the same core forms yet another feature indicative of the skill displayed by the artificer (see fig. 23, no. 83; fig. 21, no. 84; fig. 24, no. 85 and fig. 22, no. 86). Core rejuvenation flakes supply the third category of evidence. They prove for certain that whenever the cores, while still capable of yielding blades, lost their form in the course of flaking, they were not only not discarded but brought back to shape by way of preparing fresh platforms and rectifying the amorphousness of the body.

In order to gain an objective understanding of the technique and also to have an idea of the size range of the artifacts, metrical study has been made of the fluted cores (15 examples) and 103 blades (90 unworked specimens plus 13 retouched examples). The results are shown in Tables 1 to 19 (see also figs. 3-12). The following observations emerge from this study.

The fluted cores vary in length from 29 to 75 mm., with a mean value of 48

mm. The largest number (40%) fall in the 41-50 mm. class. Speaking in broad terms, three length-groups could be recognised: 33.3% fall in the 21-40 mm. group, 46.7% in the 41-60 mm. group and 20% in the 61-80 mm. group. The B/L ratio is spread widely and does not show any peak of significance. It varies from 0.41 to 0.95, with 8 specimens (53.4%) ranging from 0.41 to 0.65 and the rest from 0.71 to 0.95. The value of this index lies in revealing the elongated form of the cores – a feature typical of the blade technique. Further, that they are thick in relation to breadth – a feature related to the multiple number of blades intended to be detached and hence necessarily to be expected on cores of this kind – is shown by the T/B ratio. Although the values are again dispersed, we may distinguish two classes: 10 specimens (66.7%) belong to the 0.46-0.75 class and the rest to the 0.76-1.00 class. The specimens of the former class have a flat oval cross-section, whereas the latter group of cores possess a circular or nearly so cross-section. With regard to blades, they vary in length from 22 to 60 mm., with a mean value of 38 mm. The largest number (49 specimens or 47.6%) are in the 31-40 mm. class, with a subsidiary peak at the 41-50 mm class. As in the case of fluted cores, the B/L values of these artifacts are also devoid of a significantly high peak and vary from 0.16 to 0.80. Making a broad zonation, we however see that 74 specimens (72%) are included in the 0.16-0.50 class and the remaining 29 examples in the 0.51-0.80 class. In other words, nearly two-thirds of the series have a length twice or more of the breadth – an attribute generally used while defining a blade blank. As for the T/B ratio, as many as 95 examples (92.2%) have a thickness 0.50 of and below breadth, and this at once establishes the thin form of the blanks.

Studying the cores and the blades together, we observe an anomaly in respect of their lengths (see fig. 13). The peak in the cores falls at the 41-50 mm. class, whereas in the case of blades it is located at the 31-40 mm. class. Further, while cores measuring over 60 mm. do occur in the assemblage (2 of the 61-70 mm. class and one of the 71-80 mm. class), there are no blades corresponding to either of these length classes. Even the mean values of the two groups of artifacts show a margin of 10 mm. The explanation is twofold. Numerically, the assemblage is a small one and that too obtained on surface, and this imposes severe limitations on the metrical study. Secondly, a careful examination of the negative flake-scars, or flutings, left on the cores has revealed that in many cases the blades failed to come off along the entire length of the core. This phenomenon is attributable partly to the presence of flaws in the raw material and partly to the uneven form of the core-end facing the one from which blades are struck. (This extremity of the core is often either pointed or chisel-ended, thus allowing only some blades to come down the entire length.)

Flake-tool tradition occupies but a minor place in the assemblage. There are

only 8 finished implements fashioned on this category of blanks, which all seem to have been struck from discoidal cores of Mousterian type. A typical core of this kind is available in the assemblage (fig. 21, no. 79). Finally, it may be added that dressing flakes, fluted cores, core rejuvenation flakes and natural pieces are also used, albeit rarely, as blanks for implement manufacture.

The secondary working employed in shaping the raw blanks into implement types is of the following four forms. Edge-trimming, retouching, is the simplest of all; it is generally executed from ventral surface in an oblique fashion, so that the width of the blank is affected but in a minimal way. Retouched blades and a few specimens of the scraper group are obtained by this working. Backing (also called blunting), representing an accentuated variety of edge-trimming, is employed on various kinds of points, backed blades and perforators. In this working the retouch-forming removals are struck at right angles or nearly so to the plane of working (i.e. ventral surface), so that the margin acquires a blunt or steep-sided appearence. Scrapers, more especially end- and discoidal forms, are shaped by means of a different form of working. Here the removals take the form of narrow flutings, which spread obliquely over a considerable portion of the dorsal surface. The fourth form of working is formed by burin-faceting. It consists of removing, singly or in series, thin and narrow slices of material (technically known as spalls) on the thickness of the blank. In angle burins it is employed alongside backing.

B. Typology

As mentioned earlier, the assemblage is comprised of 391 specimens. They may first be classified into two groups: a) finished implements and b) simple artifacts. The former include specimens shaped into definite types by means of secondary working. Simple artifacts include cores, unworked blanks, by-products of working, etc. Sixty-nine specimens (17.67%) belong to the first group, and the rest are simple artifacts. The ratio of finished implements to unworked pieces thus roughly stands at 1 : 5. The type-wise breakdown of the assemblage is shown in Table 5. Description of each of these types is in order.

1. GRAVETTE POINTS

As commented above, they are all shaped by means of backing. The following further details about their manufacture are noteworthy. The butt is invariably formed by the bulbar end of the blank, and with the exception of a single example, the platform as also the bulb of percussion are completely erased.

Backed margin – the chief attribute of the type – is on the left side of the implement in 5 examples and on the right side in the remaining 3 specimens. Backing itself is executed from ventral surface in a continuous along the entire length of the margin, without leaving any kind of gibbosity such as that characterising some of the specimens belonging to the Upper Perigordian of France. The butt is left unworked in two specimens (fig. 14, nos. 1 and 2); in the remaining examples it is given a V-like form by blunting the basal portion of the opposite margin in an oblique fashion. The working end is shaped in much the same way, i.e. by retouching or blunting obliquely a small portion of the opposite margin. (The specimens shown in figure 14, number 1 and 3, are free of any working at this portion.) As for their size, the largest and smallest specimens measure in length 67 and 23 mm. respectively, another 32 mm., and the rest vary from 42 to 48 mm. In breadth they vary from 6 to 15 mm. All are within the thickness range of 3 tot 5 mm.

Movius *et al.* (1968, 43-4) have recently advocated a classification of these artifacts into 6 types such as the parallel sided, sub-parallel sided, bellied, etc., each divided further according to the outlines of the two longitudinal margins of the implement. However, it is not possible to follow this system here, as the specimens are too few in number and also because some of them do not conform to any of the types recognised by the said authors. Basing on the contour of the backed margin, the present examples could be grouped into 3 types. The specimen shown in figure 14, number 1, has its margin backed in a straight line. In 4 specimens (fig. 14, nos. 2-5) it assumes a somewhat curved outline. The remaining 3 specimens (fig. 14, nos. 6-8) bear a general resemblance to the Chatelperron points inasmuch as the backed margin has a fully convex form.

2. TJONGER POINTS

These artifacts share all the attributes of the Chatelperron points, and the term "Tjonger Points" itself had been coined by Bohmers (1956, 9) to describe specimens less than 50 mm. in length. While recognising the subjective nature of Bohmers' criterion, the use of this new term is continued here for the sake of avoiding confusion. In the 3e exampless occurring in the present collection, it is the right margin which has been blunted to a convex outline; the butt is left untouched in all. The specimens illustrated in figure 14, numbers 9 and 10, measure 41 x 16 x 6 mm. and 41 x 12 x 4 mm. respectively[1]. Both have sharp working ends; in the former the concave upper portion on the opposite margin bears minute retouch. The third specimen (fig. 15, no. 11), measuring 48 x 13 x 4 mm., is rather crudely formed, since the working end is blunt and also because the backing does not continue up to the base.

3. SHOULDERED POINT

This is a solitary but well-finished specimen, and measures 47 x 13 x 4 mm. (fig. 15, no. 12). The shouldered butt is shaped further by retouching a small portion of the opposite (i.e. right) margin.

4. BACKED BLADE

The specimen is well-finished, with the backing executed in a straight line along the entire length of the left margin (fig. 15, no. 13). The opposite margin is free of secondary working. Its measurements are 55 x 10 x 4 mm.

5. TANGED POINTS

They constitute the most distinctive type of the assemblage. The tang, formed at the bulbar end, is shaped by blunting both margins deep into the width of the blank, so that the margins are left with a distinct shouldering effect and the tang itself assumes a form which, for want of a better term, may be described as rod-like. As will be described below, the point is retouched variously on one or both sides and on the ventral or dorsal surface. The specimen illustrated in figure 15, number 14, is the largest of the 3 examples and measures 48 x 18 x 5 mm. The tang curves away to the right side, thus imparting an asymmetric form to the artifact. (The scar-like fracture observable on the ventral surface seems to have been caused in the course of subjecting the margins to blunting.) The point is prominently formed, with both the sides retouched on the dorsal surface continuously up to the tang-forming shoulders. The second example measures 48 x 18 x 5 mm. (fig. 15, no. 15). Both sides of the point are retouched on the dorsal surface, but this retouch stops short of the tang on the left side. The large scar seen on the ventral surface at this end of the artifact is of accidental origin. Like the preceding one, the third specimen is also symmetric in shape, and measures 46 x 12 x 8 mm. (fig. 16, no. 16). The tang is beautifully finished; the modern origin of the ventral fracture appearing on the left shoulder is attested by its fresh (unweathered) nature. The left side of the point is retouched on the ventral surface; the extreme portion of the opposite side also shows traces of retouch.

6. SCRAPERS

They are made on blades, flakes, etc. The longest and shortest specimens measure 64 and 17 mm. respectively; 4 examples fall in the 21-30 mm. class, 6 in the 31-40 mm. class, one in the 41-50 mm. class, and the remaining 4 in the 51-60 mm.

class. In breadth one specimen (fig. 16, no. 17) measures 41 mm., 2 are of the 11-15 mm. class, 6 of the 16-20 mm. class, 7 of the 21-25 mm. class, and the last one of the 26-30 mm. class. Two specimens meausure 4 mm. in thickness, 11 are of the 6-10 mm. class, and the remaining 4 belong the 11-15 mm. class. With the form of the working edge serving as the guide, these artifacts may be studied under 6 types as follows:

a) *End-scrapers*

Barring one specimen which is made on a flake (fig. 16, no. 17), all are fashioned on blades. (The base is broken in 2 examples.) The working edge is formed at the distal end in all specimens. In one case (fig. 16, no. 20) it is obtained by merely blunting the extremity; the rest are shaped by means of the fluted form of working described earlier. With regard to the outline of the working edge, the specimen made on flake (fig. 16, no. 17) belongs to the ogival, or blunt-pointed, type; the rest possess rounded edges. The latter are again distinguishable into two classes. Two specimens (fig. 16, nos. 18 and 19) have perfectly rounded edges with their contours approaching the arc of a circle, and the others (fig. 16, nos. 20-2) are of the asymmetric type. Number 21 has its right margin retouched all along on the dorsal surface.

b) *Square-ended scrapers*

Basically they belong with the end-scraper group, the only difference being that the working edge now runs in a straight line. Both the specimens are made on blades, and are broken at the base (fig. 17, nos. 23 and 24). Number 23 has its edge shaped by means of backing; in the second example it is merely retouched and somewhat obliquely orientated in relation to the main axis of the tool.

c) *Concave scrapers*

Both the specimens are made on elongated blanks, and bear the working edge on one of the margins. The artifact shown in figure 17, number 25, is fashioned on a core rejuvenation flake. The working edge, located on the right margin, is retouched all along from ventral surface. The blank for the other specimen (fig. 17, no. 26) is formed by a natural (frost-split) flake. The working edge is shaped on the left margin – partly retouched and partly subjected to irregular chipping from the upper surface.

d) *Notched scraper*

It is made on a slender blade (fig. 17, no. 27). The notched edge, measuring about 14 mm. wide and 3 mm. deep and occupying the middle portion of the right margin, is shaped by retouching the margin from ventral surface. The distal end also shows traces of retouch.

e) *Convex scraper*

The specimen is made on a small, triangular flake (fig. 17, no. 28). The left margin and the distal end are so retouched from ventral surface as to give rise to a fan-shaped working edge.

f) *Discoidal scrapers*

The workmanship witnessed on these implements is by any standards of the finest quality. All are made on short flakes and worked exclusively from ventral surface. In the specimen illustrated in figure 17, number 29, the periphery (platform region excluding) is merely retouched. The remaining 3 examples (fig. 17, nos. 30-2) display characteristic steep working, which spreads over a considerable portion of the dorsal surface.

7. BURINS

Of the total number of 9 examples, one is made on a nodular piece, another on a fluted core, and the rest are fashioned on blades. The longest and shortest specimens measure 71 and 25 mm. respectively, another 53 mm., and the remainder belong to the 31-40 mm. class. In breadth 6 specimens vary from 15 to 19 mm. and the rest from 22 to 31 mm. They vary in thickness from 5 to 16 mm. Despite their occurrence in a small number, as many as 5 forms (single-blow,*bec-de-flûte* polyhedric, angle and parrot-beak) could be recognised among these artifacts. Angle burins (5 specimens) constitute the dominant class.

The specimen illustrated in figure 18, number 33, is a good example of the single-blow form; the working edge is formed by the intersection of a single facet struck vertically on the left margin and the oblique but flat-faced distal end. *Bec-de-flûte* (fig. 18, no. 34) and polyhedric (fig. 18, no. 35) forms are each represented by one example; both are of the asymmetric type in that the working edge lies away from the median axis of the blank. With regard to the angle burins, the specimens shown in figure 18, numbers 36 and 37, fully satisfy the definition that the working edge should be formed by the intersection of facets and a retouched edge. In both cases the retouch is executed in a steep fashion. In the

remaining 3 examples the edge facing the facets is devoid of any retouch but only formed by the truncated extremity of the blank. One of them is made on a tabular-bodied fluted core (fig. 18, no. 38). The specimen shown in figure 18, number 39, is fashioned on an elongated nodular piece; here the truncated end runs parallel, and not transverse, to the facets struck vertically on the right margin. The lower extremity is worked secondarily to a rounded form, so the piece seems to have been meant as a burin-cum-end-scraper. In the last example (fig. 18, no. 40), the oblique truncation is done on the dorsal surface. The parrot-beak burin (fig. 18, no. 41) essentially belongs with the angle burin class (compare no. 37). However, the edge opposing the facet is retouched to a convex shape; the margin is further retouched down to the butt.

8. PERFORATORS

Two of them are made on flakes, another 2 on blades and the remaining 2 on by-product flakes. The longest and shortest specimens measure 50 and 23 mm. respectively, and the rest vary from 32 to 42 mm. Their breadth ranges from 12 to 29 mm. All are within the thickness class of 4 to 9 mm. In two specimens (fig. 19, nos. 42 and 43) the business end shows working on one side only. The remaining 4 examples display working on both sides of the business end (fig. 19, nos. 44-6). Interestingly enough, the butt is also worked secondarily in numbers 44 and 45.

9. RETOUCHED BLADES

The retouch occurring on these artifacts is strictly confined to the margins. Four specimens have one of their margins retouched all along (fig. 19, nos. 47-9). Two specimens display retouch along both margins (fig. 19, nos. 50 and 51). (The possibility cannot be ruled out that number 50 was meant to be a point.) The remaining 7 examples show retouch on one of the margins, but the working never extends along the entire length (fig. 19, nos. 52-4).

10. MISCELLANEOUS

This head does not cover any specific type as such but only includes broken pieces derived from implements belonging to some of the types described above. With regard to their typological affiliations, 4 are derived from Gravette points (fig. 19, nos. 56-8 and fig. 20, no. 59), one is a middle portion of backed blade (fig. 19, no. 55), and the remaining 3 are upper portions (i.e. working ends) of and scrapers (fig. 20, nos. 60 and 61).

11. UNWORKED BLADES

These artifacts are totally free of any kind of secondary working. However, some 20 specimens bear use-marks along one or both margins. The specimens illustrated here (fig. 20, nos. 62-70) – numbers 62 to 65 with use-marks – are intended to serve as a guide to the various size ranges available in the assemblage and also to give an idea about the degree of parallelism of margins, the nature of working on the dorsal surface and such other technological attributes.

12. BLADE SECTIONS

They consist of segments derived from transversely broken blades. Seventeen are bulbar portions, 13 represent distal portions, and the rest are middle portions. Twenty-two pieces are of the 11-20 mm. length class, 6 of the 21-30 mm. class, 8 of the 31-40 mm. class, and the rest belong to the 41-50 mm. class. Their origin is problematic. Whether they are accidental or purposely broken to be used as elements for composite tools, could be ascertained only through an examination of larger samples. Two pieces show definite retouch along the margins (fig. 20, nos. 71 and 72).

13. CORE REJUVENATION FLAKES

They represent the by-products of secondary form of core preparation. Three are roughly discoidal in outline, and are struck from the extremities while making fresh platforms (fig. 20, no. 73). The other specimens are blade-like and evidently struck along the major axis for rectifying the bodily amorphousness (fig. 20, nos. 74 and 75).

14. UNWORKED FLAKES

Three specimens are of the prepared core, or Levallois, type, and have their dorsal surfaces fully worked (fig. 21, nos. 76 and 77). The remaining 2 examples seem to have been obtained by the ordinary stone hammer technique (fig. 21, no. 78).

15. CORES

Mention first needs to be made of the fine discoidal core illustrated in figure 21, number 79. Its measurements are 46 x 40 x 30 mm. It is flaked alternately from both surfaces, thereby leaving a jagged edge around the periphery.

The remaining 15 specimens are fluted cores. Comments have already been of-

fered about their size, form, initial dressing, nature of platforms and such other features. In the past cores of this kind had been classified according to the number of platforms, i.e. specimens with a single platform, with two platforms and so on. But this criterion is not of universal application, since it is not necessarily the case that blades are struck from purposely made and clearly defined platforms. On the other hand, cases are not lacking where blades have been struck from a plane surface of restricted dimensions, formed either by a small portion of a previous blade scar or by a slope original to the extremity of the core, by merely keeping the core at an appropriate angle (e.g. fig. 23, no. 83). It seems more logical to group them according to the number of directions in which blade detachment has been effected. Following this system, two main varieties could be distinguished among the present examples. In 8 specimens flaking has been carried out in one direction only, partly or all over the body but always along the major axis (fig. 22, nos. 80 and 81; fig. 23, no. 82). The remaining examples display three forms of bi-directional flaking as follows. In 4 cases blades are struck from both ends and on the same surface, in a way that the two runs of flutings intersect each other (fig. 23, no. 83 and fig. 21, no. 84). Two are worked alternately from one end and on surface (fig. 24, no. 85). In the last specimen (fig. 22, no. 86) the two runs of flutings lie at right angles, i.e. one proceeding along the major axis and the other in a transverse (breadth-wise) direction. Two specimens evidence retouch along the margins, so it is not unlikely that they served as scraping tools (fig. 21, no. 87).

16. ATYPICAL NODULES

They consist of shapeless pieces measuring below 100 mm. along the major axis. All have fractured surfaces interspersed with cortical patches, but the flake scars are extremely shallow and devoid of definite negative bulbs of percussion. So it seems best to explain them away as frost-split pieces. The cortexed portion of the example shown in fig. 24, number 88 (part of a rounded nodule) shows clear batter marks, which may have resulted from its use in connection with flint knapping.

17. BY-PRODUCTS

Of the total number of 155 pieces, 129 are flakes and flakelets (62 of thumb-nail size) resulting from core dressing and related processes of primary flaking. The remainder are spalls produced while shaping burins, scrapers, etc. by means of the fluted form of secondary working.

Summing up the study, the main points of interest about the assemblage may be noted as follows:

Despite the fact that it is made on surface, the assemblage does not show any signs of admixture with younger materials like the Mesolithic and as such may be regarded as homogeneous in character. Further, its non-selective nature is attested by the presence of waste products and several other categories of unworked, or simple, artifacts. That all industrial activity – the production of blanks as well as shaping them into implement types – took place at the site itself is authenticated by, among other things, the high proportion (about 40%) of residual flaking material. The blade-tool character of the assemblage is rendered obvious by the fact that about 80% of the finished implements are fashioned on blanks obtained by means of the fluted core technique. The features relating to the preparation of cores at both the primary and secondary levels of flaking, the detachment of blades in more than one direction, and the generally neat form of the blades themselves indicate that the technique is a developed one.

As is to be expected on any site with workshop tradition, finished implements occur in a small number and form a mere 18% of the assemblage. The typological ensemble is made up of 6 groups. Scrapers (about 25%) constitute the principal group, and are of 6 forms. End-scrapers form the leading type, but the specimens belonging to the discoidal class are the best finished artifacts of the whole group. Backed tools and retouched blades occur in equal proportions, each group accounting for about 19%. Of the 4 forms available among the backed tools, Gravette points constitute the major type and make up for about 12% of the finished implements. Burins (13%) are of 5 forms. A noteworthy feature about these artifacts is with regard to the presence of a specimen belonging to the parrot-beak form, which is most commonly, if not exclusively, associated with the Magdalenian of France. Perforators (about 9%) bear straight working ends and thus present a contrast with the *Zinken* category of implements.

Tanged points (about 4.5%) form a distinct group by themselves. They are of a non-microlithic size: all are made on rather broad (18 to 22 mm.) and thick (5 to 8 mm.) blades and vary in length from 48 to 50 mm. The tang is prepared by means of backing executed exclusively from ventral surface. The point itself is triangular in outline, a form essentially natural in origin inasmuch as it is resultant upon the tapering off the two margins and their culmination at the distal extremity of the blank. (The secondary working on this part of the artifact does not display any pattern, for it is executed variously on or both margins, up to or short of the tang-forming shoulders and from dorsal or ventral surface.) Lastly, it is important to take note of the negative feature of the absence of secondary working of any kind on either of the two surfaces of the artifact.

III. DISCUSSION

Having equipped ourselves with an account of the character of the flint assemblage, we may now proceed to a study of the site in the context of the Late Palaeolithic culture-sequence as known in this country and adjacent territories. As stated in the beginning, the site is essentially in the nature of a surface scatter of flints without any form of evidence for dating. Moreover, the cultural remains themselves are limited to the flint artifacts, and there are no bone or antler objects and the like which could serve as supplementary items in determining the cultural context of the site. Happily enough, the flint assemblage is not only of a non-selective type but presents a homogeneous appearance, and it is these two features which allow us to accept the assemblage as a reliable basis for our study. Our discussion here concerns with a) finding out the cultural affiliations of the site, b) identifying the new feature(s) hitherto not available at the sites of the parent culture as known within the country, and c) assessing the significance of the new features so identified in terms of extra-territorial relations of the parent culture.

That the site has no affinities with the Aurignacian or any other Upper Palaeolithic culture of the classic area of south-western France – an opinion expressed by Vermaning and a possibility considered, albeit casually, in the initial stages of study – is only too obvious to need any more than a passing remark. Suffice it to say that, apart from the commonness of elements relating to blade technology and the like, our assemblage is lacking in the distinctive traits associated with the French cultures. Moving closer, we are on equally sure grounds that the assemblage has no relationship whatever with the blade-tool collection – termed Upper Perigordian – reported recently from Maisiers-Wartons in Belgium (Hubert, 1968). By virtue of its association with a crude blade technique and tanged points and other implement types bearing typical surface working, this assemblage differs fundamentally from the Norgervaart assemblage. In fact, the site could well be studied within the framework of the three-tier Upper Palaeolithic sequence known in this part of the continent, i.e. the Hamburgian culture followed by the *Federmesser* culture and the latter in turn followed by the Ahrensburgian.

Examining the assemblage apposite the Hamburgian, we notice striking typological differences. The commonness of burins, scrapers, retouched blades and perforators is a general one and hence of no diagnostic value. The shouldered point – the type-tool of the Hamburgian – available in our assemblage is admittedly of a characteristic form. But it is to be remembered that the case is that of a single example and therefore does not carry much significance with it, the more so when it is realised that isolated examples do occur at sites like Usselo (Hijszeler, 1957, 294) which are decidedly of non-Hamburgian character. In-

stances of this kind serve no more than to indicate the survival of older traits into later periods. Despite the family resemblances, even the tanged points of our assemblage differ in a striking way from the Havelte points of the Hamburgian. The latter are long and narrow measuring up to 85 mm., whereas the Norgervaart points are short and broad. A second difference relates to the preparation of the tang of Havelte points frequently by means of inverse backing, a feature not to be observed at all in the present series. The most striking difference is formed by the virtual absence of Gravette points, Tjonger points and backed blades in the Hamburgian. Lastly, *Zinken* which are of ubiquitous occurrence in the Hamburgian, are lacking in our assemblage.

The possibility of the site belonging to the Ahrensburgian culture is ruled out on equally firm grounds. Lying as it does in the northern part of the country, it falls away from the Ahrensburgian sites which are all confined to the south-eastern corner. With regard to flint typology, the commonness of burins, scrapers, retouched blades and perforators is again a general one. As we will note later on, backed tools comprising Gravette points, Tjonger points and backed blades do occur in the Ahrensburgian assemblages, but their presence in small numbers and at only some of the sites suggests that they are not an integral element of the culture. So it is not possible to regard them as linking up our assemblage with the Ahrensburgian. As with the Havelte points, the Norgervaart tanged points do bear a family resemblance with the Ahrensburg tanged points, and even the technological attributes are much the same. Reserving our comments about the significance of these similarities to a later stage, it is necessary to emphasise here that, unlike the Ahrensburg points which generally measure below 40 mm., the Norgervaart tanged points are of non-microlithic order and as such belong to a different cultural tradition. The most outstanding difference marking off our assemblage is formed by the total absensce of obliquely blunted points, trapezoids and triangles, which all are associated with the Ahrensburgian.

Considering now the site in relation to the *Federmesser* culture, it must at once be conceded that the flint assemblage shows no absolute typological identity with any of the three groups recognised within this culture, still less with the assemblage from one particular site[2]. If the *Federmesser* culture is to be understood in terms of certain constantly recurring implement types, there is nevertheless ample justification for including our site under this cultural group. Above all, three types, all forming part of the backed tool tradition, serve as the connecting links. Gravette points constitute the chief diagnostic type of the *Federmesser* culture, and are present, if in varying proportions, at nearly every known site. The Norgervaart specimens are strikingly similar to the examples from the sites of this complex. The same holds true with regard to the Tjonger points (Schwabedissen's

(1954, 8-9, Abb. 11) *Federmesser*). Despite their occurrence in varying numbers and their classification, as sometimes done by Schwabedissen, variously under backed blades, krems points, etc., these artifacts are also common enough on the *Federmesser* sites to be regarded as forming another integral element of the culture. The three examples from Norgervaart are characteristic of their kind and supply yet another uniting link. Backed blades, with or without retouch at the ends, constitute one more type common on the *Federmesser* sites. Although exemplified by a single specimen only (or two, if the broken example is taken into account), this type again finds representation in our assemblage. It is thus clear that we have in Norgervaart one more site of the *Federmesser* complex. This view derives further strength from its location in the area housing a large number of *Federmesser* sites including the famous stations of Makkinga and Donkerbroek (see the map in fig. 1).

While its *Federmesser* character is a certainty, it cannot be overlooked at the same time that, when studied together with the other *Federmesser* sites in the Netherlands, the site shows a degree of individuality. This is revealed by the absence of Creswell and Cheddar points and by the occurrence of artifacts belonging to the shouldered point and parrot-beak burin types. It should be mentioned, however, that not all the known sites in the Netherlands yield Creswell and Cheddar points and that even the shouldered point and parrot-beak burin types do find representation at sites like Usselo and Budel (Bohmers, 1947, fig. 29, no. 11) respectively. These typological differences merely serve to emphasise the range of variation that could be expected among the *Federmesser* sites. The single one type clearly marking off Norgervaart from the rest is formed by the tanged points, and these artifacts indeed form the special feature of the site.

Widening the scope of our study, we immediately realise, however, that Norgervaart is not the only *Federmesser* site characterised by tanged points; on the other hand, this artifact type has been recorded at over 20 sites in northern Germany. These sites have already been described in full by Schwabedissen (1944, 1954) and Taute (1963, 1968). It suffices here to note their names and the number of tanged points (given in brackets) known from them:

1. Ahrensburg, Borneck-Mitte (4)
2. Dohnsen (2)
3. Rissen 14 (1)
4. Rissen, Timmermans Moorloch (2)
5. Fiener-Bruch, Dune 14, Schicht 5 (1)
6. Rissen 15a (5)

7. Sprenge	(2)
8. Clausheide	(1)
9. Rissen 3	(1)
10. Rissen 12	(2)
11. Lubars	(1)
12. Zedlitz	(1)
13. Kremmen	(1)
14. Rissen 1a	(4)
15. Tolk A	(13)
16. Wustrow a.d. Jetzel	(2)
17. Kremkau	(3)
18. Schonningstedt 129	(1)
19. Schonningstedt-Ohe	(2)
20. Grande	(3)
21. Oster-Bunsbuhl A	(1)
22. Fiener-Bruch, Holzbreite	(11)
23. Fiener-Bruch, Dune 6	(1)

Of the 23 stations listed above, numbers 1 to 5 are excavated sites, numbers 6 to 13 are of surface nature, and the rest yielded *Federmesser* assemblages mixed up with finds belonging to the Mesolithic and Neolithic periods. They are all clustered together in the area stretching from Flensburg Fjord to the middle reaches of the Oder river (see Karte 9 in Taute, 1968)[3]. Clausheide deserves a separate mention here. Situated as it is in the Bentheim Kreis (Niedersachsen), it lies very close to the Dutch border. Apart from tanged points, the flint assemblages from these sites are associated variously with Gravette points, Tjonger points, backed blades, burins, scrapers, etc. Rissen 14 is firmly dated to the Alleröd period on the basis of the geological context of the cultural horizon as well as on the evidence supplied by C-14 dates and pollenanalytical studies (Schwabedissen, 1957; for a discussion of the evidence from the Dutch sites, see Hijszeler, 1957). So we may take for granted the Alleröd age of these sites. A short description of the tanged points themselves is in order.

The specimens are invariably made on blades. The tang, shaped at the bulbar end, is obtained by bi-marginal blunting executed from ventral surface. (The specimen from Rissen 14 (Schwabedissen, 1954, Tafel 12, no. 24) is worked on one of the margins by two burin blows.) It is of three forms: a) triangular, resulting from the working of margins in an oblique manner, b) parallel-sided, resulting from the working of margins parallel to the main axis of the blank, and c) rod-like, as in the specimens from Norgervaart, where the two blunted margins meet each other or nearly so. In some examples the point is treated

with either retouch or blunting; as in the specimens from Norgervaart, this secondary working is not only lacking in uniformity but never extends over the surfaces. The artifacts are by and large symmetrically formed, though it should be mentioned that asymmetric examples do occur at Grande (Schwabedissen, 1954, Tafel 1, no. 22) and several other sites. With regard to size, a great majority of them belong to the 40-60 mm. length class. In breadth most of the specimens fall in the 16-25 mm. class. The largest (99 mm. long and 32 mm. broad) and smallest (22 mm. long and 10 mm. broad) specimens come from Schonningstedt 129 (Taute, 1968, Tafel 90, no. 3) and Fiener-Bruch, Holzbreite (Taute, 1968, Tafel 120, no. 6), respectively. With the contours of the two margins contributing towards the formation of point serving as the basis, two principal forms could be distinguished among these artifacts, viz. parallel-sided and triangular. In the former variety, the two margins run parallel to each other or nearly so form the tang-forming shouders, and the point itself is formed by the intersection of the angulated extremities. The specimens from Ahrensburg, Borneck-Mitte (Rust, 1958, Tafel 25, nos. 19-23) may be cited as typical examples. In the triangular variety, the margins run in an oblique manner and culminate at the distal extremity to give rise to the point. The tanged point from Rissen 14 (Schwabedissen, 1954, Tafel 12, no. 24) constitutes a fine example of this form. It must be clarified that this twofold division is purely typological and does not carry any chronological or cultural significance, since the two forms occur side by side at several sites.

Comparing the three tanged points Norgervaart with the series described above, their identical nature hardly fails observation. The attributes relating to the preparation of tang by means of ventral backing, the inconsistent and ununiform nature of secondary working at the point, and the absence of surface working are common to both series. As to the over-all form, all the three specimens from Norgervaart belong to the triangular variety. By virtue of belonging to the length class of 40-50 mm., they agree with the above series in respect of size also. We are, therefore, fully justified in concluding that the two series belong to one and the same tradition.

The one feature about these artifacts calling for explanation is their exiguity. As can be made out from the list provided above, they occur in extremely limited numbers ranging from one to four. Fiener-Bruch, Holzbreite and Tolk A are the only sites which produced them in significant numbers, the figures being 11 and 13 respectively. This rarity becomes all the more conspicuous when it is understood that our list of sites by no means exhausts the total number of *Federmesser* sites. Although they are present at over 20 sites in northern Germany, there are a number of sites in this region completely lacking in these artifacts. With regard to the Netherlands, Norgervaart remains to be the only site out of over a hundred

scattered all over the eastern and southern parts of the country. It is these twin factors of occurrence at only a small number of sites and in severely limited numbers which lead us to conclude that these artifacts do not constitute an integral element in the *Federmesser* culture. Stated differently, they can only be described as forming a trait of exotic origin. The question inevitable crops up: What is the source of its derivation? In seeking an answer to this question, we may first of all consider the following two rather remote possibilities.

Could this trait be derived from the Magdalenian? This possibility needs to be considered in view of the hypothesis raised by Schwabedissen (1954, 71-8) about the Magdalenian origin of the *Federmesser* culture. In short, he believes that the late Upper Palaeolithic sites of South Germany represent the expansion of the Magdalenian VI of France. He recognises three regional groups among these sites, viz. the Döbritz group in central Germany and Moravia, the Thayngen group in the Lake Constance area, and the Probstfels group in southwestern and western Germany. In the wake of climate improvement during the Alleröd period, the Magdalenian settlers of his region began to spread over the lowlands to the north-west and thus gave rise to the *Federmesser* culture. (He holds the Probstfels groups responsible for the origin of Rissen and Wehlen groups, while the Tjonger group was derived from the Creswellian of England.)

The dating of the Magdalenian VI of France to the Bölling oscillation (for details, see Movius, 1960, 372-3) and of the South German complex to the time period covered by the Bölling and Alleröd oscillations (for details about the C-14 dates from a few localities of this area, see Gross, 1957, 147-8 and 155), and the rather close agreement in flint typology as well as bone and antler objects do seem to argue for the Magdalenian origin of the South German complex. But the same cannot be said with certainty about the South German origin of the *Federmesser* culture. First of all, our knowledge of the South German sites is incomplete, and a comprehensive study is truly a desideratum. Secondly, while it is true that certain implement types like the Gravette and Tjonger points ar common to both complexes, such evolved types as the crescentic backed blades, multiple borers and denticulate tools are absent in the *Federmesser* assemblages. Thirdly, as rightly emphasised by Schwabedissen himself, bone and antlers objects which could be used as supplementary tools for purposes of comparison, are also lacking in the *Federmesser* culture. In effect, the South German origin of the *Federmesser* culture still remains to be a matter of probability. In any case, at the present state of knowledge it is not possible to conceive of a South German origin for the tanged point trait under discussion, because it is almost completely unknown in this area[4]. With regard to the possibility of deriving the trait directly from the Teyjat points[5] of the Upper Magdalenian of France, we encounter similar difficulties. By virtue of its association with such specialised types as the

crescentic blades, denticulate tools, blunted bladelets, etc. and a rich assortment of bone and antler objects, the Upper Magdalenian presents a character very different from that of the *Federmesser* culture. Further, as already pointed out by De Sonneville-Bordes (1969, 187), the Teyjat points are confined to south-western France, with the Loire river serving as their northern border. And the area between this part of France and northern Europe is a complete blank.

We may next ask ourselves wether this trait was derived from the tanged-point culture of East Europe, namely the Swiderian[6]. While the chronological contemporaneity and geographical contiguity of the two cultures, and the adoption of backed tool tradition by the Stallberg-Münchehofe group suggest that there is nothing theoretically unsound in seeking after this source, a comparative study of the two series of tanged points, however, renders the possibility unlikely. Their family resemblances and non-microlithic character notwithstanding, the two series differ in a marked way with regard to the preparation of tang. The inverse blunting of margins and the treatment of ventral surface with flat retouch, which characterise the Swidry points, are conspicuous by their absence in the *Federmesser* points; nor do they show the partial surface retouch of the Chwalibogowice points. It is the absence of these attributes which preclude us from postulating any kind of relationship between the two series of artifacts.

It remains to be enquired now whether the trait was derived from that distinctive tanged-point culture of the north namely the Bromme culture of Denmark. Named after the site of Bromme lying in the central part of the island of Zealand[7], this culture indeed represents the earliest known human occupation of the West Baltic area. Next in importance to Bromme is the site of Segebro, situated in the province of Scania in the south-western part of Sweden (Salomonsson, 1964). Several other sites are also known from the Jutland peninsula, the islands of Funen, Langeland, Lolland and Zealand, and also from the south-western part of Sweden (Mathiassen, 1946, 164-79; Taute, 1968, 95-101). As we shall note shortly, it is however, highly probable that some of them are of post-Alleröd age. As for the flint industry, the Bromme assemblages is by far the most comprehensive of all. As with the Swiderian, the typ-fossil of this culture is also formed by tanged points; they account for about 17% of the finished tools in the Bromme assemblage. They are as a rule fashioned on blades and are of non-microlithic order, with the length ranging from 50 to 105 mm. The tang, located at the bulbar end, is obtained by means of bi-marginal blunting executed exclusively from ventral surface. In shape, it may be triangular, parallel sided or rod-like. The point is treated with secondary working only rarely, and even so no pattern is available – it may be present on one or both sides and partly or up to the non-perpendicular disposition of the tang and the point, several examples present an asymmetric appearance. In over-all morphology, these artifacts are

of both triangular and parallel sided forms. Finally, it should be emphasised that none of them shows secondary working of any kind on the surfaces, either at the tang or at the point.

Examining the theory advanced by Taute (1968, 213-4) that the tanged point trait of the *Federmesser* culture had its source in this Late Palaeolithic culture, we may first of all note that the two series of tanged points are so closely similar to each other as to warrant the view that they are identical. The non-microlithic size, the preparation of tang by means of backing directed exclusively from ventral surface, and the infrequent and ununiform nature of secondary working at the point are all attributes common to both series. Common too is the absence of surface working of any kind, a negative feature which at once distinguishes these artifacts from their counterparts in the Swiderian. Further, the attributes relating to the presence of both parallel sided and triangular forms and the asymmetric nature of some of the examples also characterise the two series. So there is nothing by way of tool-morphology which militates this theory of northern origin. Apart from the typological evidence, there are two other factors favouring this theory: they in fact presuppose contacts between the two cultures. First, as we noted above, the Bromme culture is dated to the Alleröd, which also forms the chronological horizon of the *Federmesser* culture. In other words, we are left in no doubt as to the contemporaneity of the two cultures. Secondly, their geographical contiguity. Of particular significance here is the clustering together of the tanged point-bearing *Federmesser* sites in the extreme portion of northern Germany, which lies immediately close to the West Baltic area forming the habitat of the Bromme culture. Thus considerations of typology, chronology and geography all lead us to identify the Bromme culture as the source parental to the trait. Basing on the preponderance of tanged points over backed tools, Taute (1968, 213) goes so far as to regard the sites of Rissen 1a and 15a, Ahrensburg, Borneck-Mitte, Sprenge and Tolk A as forming a group within the Bromme culture. While this grouping is questionable because of the implications it carries of the co-existence within the same area of populations representing different cultural traditions, the evidence from the site of Hengistbury Head[8] suggests that the tanged point trait reached up to the British Isles. And this view does not sound improbable in any way when it is remembered that a considerable portion of the North Sea was dry land during the time period presently under consideration (for details about the land-sea relations of this area, see Clark, 1936, 12-5).

If this theory of northern origin of the trait be accepted, the question immediately arises: What is the mechanism of its derivation? Here the two features of a) the occurrence of the trait-forming artifacts in limited quantities and at only a small number of sites, and b) the otherwise *Federmesser* character of these

trait-bearing sites and their spacial interpositioning with those free of the trait clearly exclude the possibility of primary diffusion of any kind. That is to say, these tanged point sites cannot be interpreted as marking the extra-territorial stations established by the authors of the Bromme culture in the course of seasonal migrations and the like. The alternate possibility presents itself that we are merely dealing with secondary diffusion; in other words, the trait was acquired by the *Federmesser* groups from the neighbouring area in the course of cultural contacts. And this explanation will be in keeping with the clustering together of the trait-bearing sites in the extreme portion of northern Germany, which, as we noted above, borders upon the area of the Bromme culture; indeed this territory could be regarded as the contact zone between the two cultures[9]. If the four artifacts from the Bromme site, which are described by Mathiassen (1946, fig. 9, nos. 2-5) as "flake knives", are any guide, it would seem that that the contacts so revealed between these two cultures were of a reciprocal type. Although the incomplete nature of the working itself and the fragmentary character of some of the pieces do not allow us to recognise any specific types, all these artifacts clearly evidence blunting and hence must be grouped under the class of backed tools. Their rarity could only be interpreted to mean that the trait is not native to the culture, and there are no sources which could be sought after without overlooking chronological and geographical considerations. We are thus led to believe that it was adopted from the neighbouring *Federmesser* culture.

To recapitulate the main points of the foregoing discussion about the tanged point trait manifesting itself in the *Federmesser* culture, it may be observed that a) this trait is not original to the culture; b) it cannot be derived from either the Magdalenian or the Swiderian; c) it was adopted from the Bromme culture of the West Baltic area in the course of cultural contacts; and d) these contacts involved the exchange of traits distinguishing the two cultures – the adoption by the *Federmesser* culture of the trait of tanged points native to the Bromme culture and the adoption by the latter in turn of the *Federmesser* trait of backed tools. So far as the site of Norgervaart is concerned, its importance is of a supplementary nature. Together with the other isolated site of Clausheide, it goes to prove that the tanged point trait was also practised by some groups removed from the contact zone formed by northern Germany.

Viewing this issue of cultural contacts in a broader perspective, it is interesting to observe at the peculiar situation presented by the spacial and temporal juxtaposition of the Swiderian, *Federmesser* and Bromme cultures and understand its implications in terms of general cultural process. It is abundantly clear by now that these three late Upper Palaeolithic cultures of northern Europe are entities by themselves, each with a make-up of its own and delimited to a specific area. Their individualistic character notwithstanding, it is possible to identify a com-

monality of artifactual, or cultural, tradition among these cultures. As we noted elsewhere, the essential trait of the Swiderian culture is formed by the production of tanged points. The same holds true with regard to the Bromme culture; and it is now known for certain that this trait was also practised, if to a lesser degree, by the bearers of the *Federmesser* culture. It is an undeniable fact that the tanged points of the *Federmesser* and Bromme cultures differ from those of the Swiderian, inasmuch as they are lacking in the attributes of inverse backing and surface retouch of the tang. But it is equally true that these three series of tanged points show an over-all general similarity if compared, for example, to the squat, pressure-flaked artifacts – and these are also tanged points – of the Aterian culture of northern Africa (for an excellent account of this industry, see Caton-Thompson, 1946). What is this over-all similarity? The answer is that it manifests itself in the generally elongated form of the artifacts and also in the absence of surface working (the surface retouch of Swiderian tanged points covers but a small portion) capable of altering the blade-blanks used for their manufacture beyond recognition. Apart from the "sameness" of these distinctive artifacts, the blade-tool character of the three cultures and the occurence of the same simple burin and scraper forms, which all make up the commonality of cultural tradition, the adoption of the tanged point trait by the *Federmesser* culture and the adoption in turn of the backed tool tradition by the Bromme culture and the Stallberg-Münchehofe group of the Swiderian culture are a clear proof that there was intercommunication between the three culture-zones. It is these factors of the commonality of cultural tradition and intercommunication which lead us to suggest that the late Upper Palaeolithic northern Europe, as occupied by the three above-mentioned cultures, was the scene of an area co-tradition. One may even consider the Creswellian of England as forming part of this area co-tradition. Furthermore, this phenomenon also seems to characterise the cultural groups of the following Younger Dryas period.

Finally, we may consider whether the trait of tanged points, as manifested in the *Federmesser* culture, holds any clues with regard to the origin of the succeeding Ahrensburgian culture. After rejecting, and rightly so, the earlier views associating this culture with the Hamburgian, Swiderian, etc., Taute (1968, 245-8) has advanced a theory of composite origins. Stated briefly, he derives the tanged point trait of the culture from the West Baltic area by conceiving of a movement of the bearers of the Bromme culture during the Younger Dryas period into the area previously occupied by the *Federmesser* people. He goes on to argue that the microlithic element (comprising obliquely blunted points, trapezoids, triangles, etc.) was innovatory to the culture and that the backed tool tradition[10] was adopted from the preceding *Federmesser* culture. In evaluating this theory of multiple origins, we are unable to dispute the innovatory character of the mi-

crolithic element and also the *Federmesser* origin of the backed tradition, as there are no other sources which could be thought of without overlooking chronological and geographical considerations. Our point of departure is with regard to the source of the tanged point tradition.

Implicit in Taute's conception of a south-southwesterly movement of the Bromme people is the belief that the climatic change in the Younger Dryas period was so drastic as to force the people move away from the West Baltic area, thus rendering it into a cultural vacuum. But the evidence at hand does not warrant this idea. We have mentioned earlier that, besides Bromme and Segebro, several sites numbering over 30 and yielding tanged points on surface are known from Denmark as well as the south-western part of Sweden. The famous tanged point from the site of Nørre Lyngby is pollendated to the Younger Dryas period (Iversen, 1946, 209, fig. 2). And it is highly probable that some of these surface sites belong to the same period (Mathiassen, 1948, 49). It thus stands beyond doubt that this area was under human occupation even during the Younger Dryas period. Inevitably, we are made to cast doubt on the postulated movement of the authors of Bromme culture to the south and south-west and thus giving rise to the tanged point trait of the Ahrensburgian culture. The explanation proposed here is that the source for this element was formed by the *Federmesser* tanged point trait. Although not forming an integral element in the tool-kit, its manifestation at a large number of sites in northern Germany and its extent up to the Dutch territory, as proved now by Norgervaart, establish for certain that the trait was widely known to the Federmesser groups. As has already been pointed out, the Ahrensburg points share all the attributes of the *Federmesser* points, the only significant difference being that the former are of a smaller size. But this reduction in size could be explained away by making it a part of the process of microlithisation, so characteristic a feature of the Ahrensburgian industry as a whole. If this interpretation be accepted, the Ahrensburgian remain to be an indigenous entity with its origins rooted in the preceding *Federmesser* culture of the area. The lack of stratigraphical evidence attesting to a transitional phase between the two cultures is not much of a problem, since the chronological succession involved here is an immediate one. The process of change may well be one of localised transformations, and the backed tool tradition-bearing Budel-Neer and Geldrop-Callenhardt groups are a significant pointer in this regard.

Prof. H. T. Waterbolk, to whom the manuscript was submitted for comments, adds:

1. *Having been left with the choice of basing the study purely on flint typology, Paddayya has convincingly shown that the Norgervaart site belongs to the Federmesser culture and not any other cultural group. He has further shown*

that this site distinguishes itself from the hundred or so Federmesser sites (hitherto described as belonging to the Tjongerian culture) recorded thus far in this country by yielding a new and distinctive artifact type, namely the tanged points.

2. *Studying the site together with the North German stations characterised by tanged points, he interprets the rarity of these artifacts as meaning that the trait was introduced into the Federmesser culture from outside. After excluding the Magdalenian as also the Swiderian from the picture, he proceeds to uphold Taute's theory that this trait was adopted from the Bromme culture in the course of cultural contacts.*
3. *While there is much to commend this theory of northern origin, it is also tempting to wonder whether both the Bromme and Federmesser cultures along with the attendant tanged point trait were not derived from a common source. The difficulty is with regard to the identification of this original source. As pointed out by Paddayya, the presence of marked differences in flint typology and the restriction of the Teyjat points to south-western France do not allow us to postulate any direct relationship with the French Magdalenian. Inevitably, we are led to think of the Magdalenian complex of South Germany. While he disregards the possibility of deriving the tanged point trait from this area, Paddayya has not altogether rejected Schwabedissen's theory that the Federmesser culture originated as a result of north-northwesterly movement of the South German Magdalenian settlers. Is it then conceivable that some of these groups ultimately reached the West Baltic area and gave rise to the Bromme culture? (As suggested by Taute, the emphasis placed by the authors of this culture on the production of tanged points may have been due to economic specialisation.) But a word of caution is necessary here. The formulation of a coherent hypothesis to this effect must necessarily be preceded by a thorough study not only of the South German Magdalenian (its component elements, internal sequence, and the association of the tanged point trait) but of all the known Federmesser sites as well. If this view about the common origin of the Federmesser and Bromme cultures is to be maintained, it must therefore be in the face of the strongly argued northern origin of the tanged point trait.*

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tor, Prof. Dr. H. T. Watterbolk, for introducing me to European prehistory by way of asking me to undertake the present work. In addition to providing excellent facilities, he has most kindly spared long stretches of his valuable time towards discussion at all stages of the work. I am grateful to him for these courtesies and many personal favours. Drs. O. H. Harsema and Dr. R. R. Newell have favoured me with their ungrudging help through the work. In a way the study would have been incomplete but for my friend Albert Lanting's faithful and masterly translation of several publications in the Dutch, German and French languages. I am thankful to the authorities of the Provinciaal Museum van Drenthe, Assen for both placing the flint material at my disposal and according the necessary permission to bring out a publication on it. A word of thanks is also due to Mr. Tjerk Vermaning, the amateur archaeologist responsible for the discovery of the Norgervaart site. His friendly and cooperative attitude served the purpose of bringing the work to a successful completion. Messrs. J. M. Smit and H. R. Roelink have jointly prepared the illustrations, and the manuscript has been diligently typed by Miss J. C. van Dijk.

NOTES

[1] These measurements are of maximum length, maximum breadth and maximum thickness, respectively.

[2] Schwabedissen's (1954) classification of the sites of this culture under the Rissen, Tjonger and Wehlen groups is itself lacking in precision. Confining ourselves here to two of the difficulties forbidding us to accept the division in its present shape, we may first refer to the overlap in the distribution of the three groups of sites. From a glance at the distribution map given by Schwabedissen (1954, Tafel 102a), it becomes clear that sites belonging to the Rissen and Wehlen groups occur side by side in the same area, namely the northern part of Germany comprising Schleswig-Holstein and portions of Niedersachsen and Brandenburg. Similar is the case with the Rissen and Tjonger sites occurring in the northern part of the Netherlands. Moreover, Schwabedissen's classification of Makkinga, Donkerbroek and several other Dutch sites, which are commonly believed to be of the Tjonger group, under the Rissen group is itself begging a question. Secondly, the typological distinction between the three groups is unclear. For instance, the two types of end scrapers bearing retouch all over (some tanged) and Wehlen points, which he considers as exclusive to the Wehlen group, also occur at some of the sites belonging to the Rissen group (e.g. Wustrow and Misburg); and tanged points, which are said to distinguish the Rissen group, are also present at some of the Wehlen sites (e.g. Grande and Sprenge). Likewise, *Dreieckmesser* and *Trapezmesser* (or Creswell and Cheddar points, to adopt the terminology of Bohmers, 1956, 11) which are regarded as a special feature of the Tjonger group, occur in some of the assemblages of the Rissen group (e.g. Rissen 15, Westerbeck and Kjellinge). These considerations emphasise the need for a reappraisal of the grouping.

[3] Tanged points in the form of stray finds are also known from over a dozen places in this area (Schwabedissen, 1954, 98; see also Taute, 1968). Attention may also be drawn here to the stray examples from Appelscha-III (Bohmers, 1947, 180, afb. 13, no. 14) and Boelenslaan (Taute, 1968, 61, Tafel 69, no. 5), both lying in the province of Friesland, the Netherlands (see the map in fig. 1 of this paper). Since it is not possible to ascertain their cultural context, these finds are not given serious consideration in the present study. (The specimens from Boelenslaan,

Rissen and certain other places compare favourably with the *Federmesser* tanged points, but this typological agreement is cited here for what it is worth.)

[4] The writer is not unaware of the occurrence of solitary specimens at Andernach and a few other sites (for details, see Andree, 1939). But these instances are few and far between, so that one is left doubting the true association of the trait with the Magdalenian of this area.

[5] De Sonneville-Bordes (1969) has recently made a comprehensive study of these tanged points. They occur in small numbers in some of the rock-shelters and caves of south-western France, and date to the terminal phase of the Upper Magdalenian. Morphologically, these artifacts compare well with the *Federmesser* tanged points, though it is not to be overlooked that the tang in some cases is shaped by means of dorsal backing.

[6] Taute (1968, provided with extensive bibliography) has recently made an up-to-date and comprehensive study of this culture. Named after the site of Swidry Wielkie, it is centered in the Polish territory formed by the valleys of the Vistula and Bug rivers and, in the course of development, extended westwards into Mecklenburg and Brandenburg and eastwards into Russia. Taute classifies the sites occurring within this wide area under five groups, viz. the Swidry Wielkie-Skaruliai, the Dobiegniewo-Eiguliai, the Zakrzow-Pludy, the Witow C-Stankowicze, and the Stallberg-Münchehofe. Most of the sites are in the nature of surface scatters of flints; however, at Swidry Wielkie and a few other places the artifacts occur in a stratified context in sand dunes. Basing on the geological context of the culture-bearing stratum at the sand dune sites and the C-14 date from Witow (Vogel and Waterbolk, 1964, 354), it is believed that this culture took shape in the Alleröd period and continued up to the beginning of the post-Glacial period. Taute (ibid., 237-42) assigns the Swidry Wielkie-Skaruliai, Dobiegniewo-Eiguliai, and Zakrzow-Pludy groups to the Alleröd period and the remaining two groups to the Younger Dryas period. Tanged points, commonly known as the Swidry points, are common to all the flint assemblages. They are made on long and relatively narrow blades, and are of both triangular and parallel sided varieties. As in the *Federmesser* tanged points, the secondary working at the point is devoid of a pattern. The tang is shaped in a characteristic way. It is given a triangular shape by blunting both margins in an oblique fashion from ventral surface; specimens worked by means of inverse blunting are of constant occurrence. More importantly, the ventral surface at this end of the artifact is most often treated with flat retouch. (In the Chwalibogowice point, which represents an evolved form of the Swidry point, the tang assumes a rod-like form and the flat retouch on the ventral surface is limited to the tip portion.)

Judging from the character of the Stallberg-Münchehofe group which extends over the area between the middle reaches of the Oder river and Lithuania, it would seem that contacts prevailed between this Polish culture and the *Federmesser* culture. In addition to artifacts characteristic of the Swiderian, the sites of the aforesaid group yield in small numbers backed tools comprising Gravette points, Tjonger points, backed blades, etc. Taute (ibid., 226-7) opines, and not without justification, that this tradition was adopted from the *Federmesser* culture.

[7] Full details about this site are available in the site-report by Mathiassen (1946; see also Clark, 1950, and Molyn, 1954). The site consists of a sand ridge with a core of moraine clay, and stands at an elevation of about 28 metres above sea level. The cultural remains occur in a thin (1 to 2 cm thick) but clearly marked layer made up of sand and charcoal; it restly directly on the moraine clay and is in turn overlain by a layer of sterile sand. The species represented among the small quantity of faunal remains recovered along with the flint artifacts include wolverine, elk, reindeer, beaver, (possibly) roe deer, swan and shell-fish. Iversen's (1946) pollenanalytical study firmly places the culture in the Alleröd period. Taute (1968, 248-50) believes that the Teyjat points of the French Magdalenian served as the prototypes for the tanged points of this culture. He goes on to suggest that, coeval with the occupation of the lowlands of northwestern Europe by the *Federmesser* groups, other groups of south-west European Magdalenian spread up to the West Baltic area and gave rise to the culture. He would further have us believe that the tanged point character of the culture ensued from economic specialisation.

[8] This is a late Upper Palaeolithic open-air site, and is situated on the south coast of England (Mace, 1959). By virtue of yielding a considerable number of backed tools (backed blades, shouldered points, Tjonger points(?), *but no Creswell and Cheddar points*) and, more importantly tanged points, it distinguishes from the so-called Creswellian cave-industries described by Garrod (1926). On the other hand, the possibility cannot be disregarded that it belongs with the *Federmesser* cultural tradition. The tanged points themsedves compare well with the *Federmesser* series.

[9] The exiguous nature of the trait, which we have taken to mean that the trait is not original to the *Federmesser* culture, could well be accounted for in functional terms. Since the hunting gear of this culture was already formed of backed of three or four types, the new trait of tanged points – artifacts constituting but another form hunting equipment – was but of little functional use and therefore failed to gain common currency.

[10] It manifests itself in the occurrence of Gravette points, Tjonger points and backed blades at several Dutch and German sites classified by Taute (1968, 218-23) under the Geldrop-Callenhardt and Budel-Neer groups.

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Postscript. The writer regrets that he was unaware of Karl J. Narr's important publication on *Studien zur älteren und mittleren Steinzeit der Niederen Lande* (Rudolf Habelt Verlag, Bonn, 1968) when the manuscript of this paper was completed.

TABLE 1. DIMENSIONS OF FLUTED CORES

(a) Length

Class (mm)	No.	%
21-30	2	13.3
31-40	3	20.0
41-50	6	40.0
51-60	1	6.7
61-70	2	13.3
71-80	1	6.7
Total	15	100.0

(b) Breadth

Class (mm)	No.	%
<15	–	–
16-20	2	13.3
21-25	2	13.3
26-30	3	20.0
31-35	4	26.7
36-40	1	6.7
41-45	2	13.3
46-50	–	–
51-55	–	–
56-60	–	–
61-65	1	6.7
Total	15	100.0

(c) Thickness

Class (mm)	No.	%
<14	–	–
15-16	3	20.0
17-18	4	26.7
19-20	2	13.3
21-22	–	–
23-24	1	6.7
25-26	–	–
27-28	–	–
29-30	3	20.0
31-32	1	6.7
33-34	–	–
35-36	1	6.7
Total	15	100.1

TABLE 2. DIMENSIONS OF FLUTED CORES

(a) Breadth/length ratio			(b) Thickness/breadth ratio		
Class	No.	%	Class	No.	%
0.44-0.45	1	6.7	<0.45	–	–
0.45-0.50	1	6.7	0.46-0.50	2	13.3
0.51-0.55	1	6.7	0.51-0.55	–	–
0.56-0.60	2	13.3	0.56-0.60	1	6.7
0.61-0.65	3	20.0	0.61-0.65	2	13.3
0.66-0.70	–	–	0.66-0.70	1	6.7
0.71-0.75	1	6.7	0.71-0.75	4	26.7
0.76-0.80	1	6.7	0.76-0.80	1	6.7
0.81-0.85	1	6.7	0.81-0.85	2	13.3
0.86-0.90	2	13.3	0.86-0.90	1	6.7
0.91-0.95	2	13.3	0.91-0.95	–	–
0.96-1.00	–	–	0.96-1.00	1	6.7
	Total 15	100.1		Total 15	100.1

TABLE 3. DIMENSIONS OF BLADES

(a) Length			(b) Breadth			(c) Thickness		
Class (mm)	No.	%	Class (mm)	No.	%	Class (mm)	No.	%
<20	–	–	< 5	–	–	<2	1	1.0
21-30	20	19.4	6-10	9	8.7	3- 4	35	34.0
31-40	49	47.6	11-15	43	41.8	5- 6	32	31.1
41-50	24	23.3	16-20	31	30.1	7- 8	25	24.3
51-60	10	9.7	21-25	17	16.5	9-10	6	5.8
Total	103	100.0	26-30	3	2.9	11-12	3	2.9
			Total	103	100.0	13-14	1	1.0
						Total	103	100.1

TABLE 4. DIMENSIONS OF BLADES

(a) Breadth/length ratio

Class	No.	%
<0.15	–	–
0.16-0.20	1	1.0
0.21-0.25	4	3.9
0.26-0.30	11	10.7
0.31-0.35	12	11.7
0.36-0.40	17	16.5
0.41-0.45	12	11.7
0.46-0.50	17	16.5
0.51-0.55	7	6.8
0.56-0.60	9	8.7
0.61-0.65	6	5.8
0.66-0.70	3	2.9
0.71-0.75	3	2.9
0.76-0.80	1	1.0
Total	103	100.1

(b) Thickness/breadth ratio

Class	No.	%
<0.10	–	–
0.11-0.15	1	1.0
0.16-0.20	6	5.8
0.21-0.25	14	13.6
0.26-0.30	17	16.5
0.31-0.35	15	14.6
0.36-0.40	23	22.3
0.41-0.45	9	8.7
0.46-0.50	10	9.7
0.51-0.55	2	1.9
0.56-0.60	1	1.0
0.61-0.65	2	1.9
0.66-0.70	1	1.0
0.71-0.75	1	1.0
0.76-0.80	1	1.0
Total	103	100.1

TABLE 5. FREQUENCY DISTRIBUTION OF THE ARTIFACT TYPES FROM NORGERVAART

Types	No.	%
GRAVETTE POINTS	8 (11.60%)	2.05
TJONGER POINTS	3 (4.33%)	0.77
SHOULDERED POINT	1 (1.45%)	0.26
BACKED BLADE	1 (1.45%)	0.26
Total of backed tools	13 (18.83%)	3.34
TANGED POINTS	3 (4.33%)	0.77
SCRAPERS		
End-	7 (10.16%)	1.79
Square-ended	2 (2.90%)	0.51
Concave	2 (2.90%)	0.51
Convex	1 (1.45%)	0.26
Notched	1 (1.45%)	0.26
Discoidal	4 (5.80%)	1.02
Total of scrapers	17 (24.66%)	4.35
BURINS		
Single-blow	1 (1.45%)	0.26
Bec-de-flute	1 (1.45%)	0.26
Polyhedric	1 (1.45%)	0.26
Angle	5 (7.25%)	1.27
Parrot-beak	1 (1.45%)	0.26
Total of burins	9 (13.05%)	2.31
PERFORATORS	6 (8.70%)	1.53
RETOUCHED BLADES	13 (18.83%)	3.32
MISCELLANEOUS	8 (11.60%)	2.05
Total of Finished Implements	69 (100.00%)	17.67
UNWORKED BLADES	90	23.01
BLADE SECTIONS	40	10.23
CORE REJUVENATION FLAKES	10	2.56
UNWORKED FLAKES	5	1.27
CORES	16	4.09
ATYPICAL NODULES	6	1.53
BY-PRODUCTS	155	39.64
Total of Simple Artifacts	322	82.33
GRAND TOTAL	391	100.00

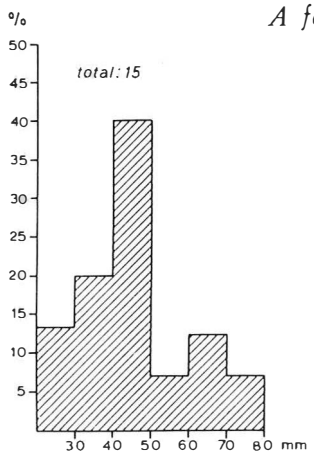

fig. 3

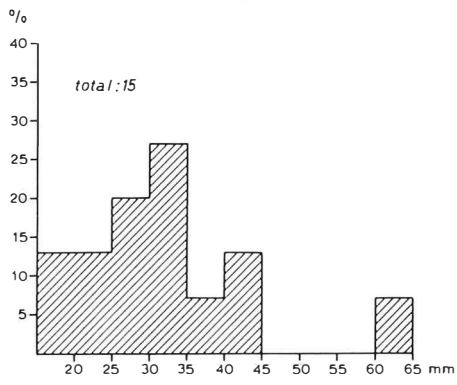

fig. 4

Fig. 3. Frequency distribution of lengths of fluted cores.
Fig. 4. Frequency distribution of breadths of fluted cores.

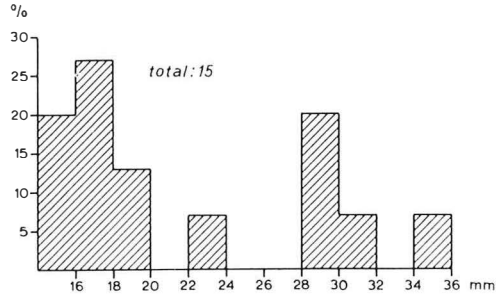

fig. 5

Fig. 5. Frequency distribution of thicknesses of fluted cores.

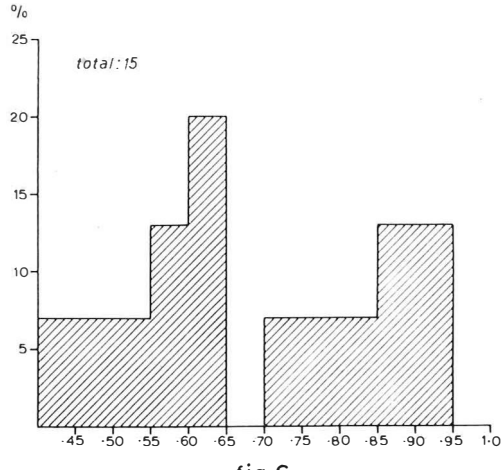

fig. 6

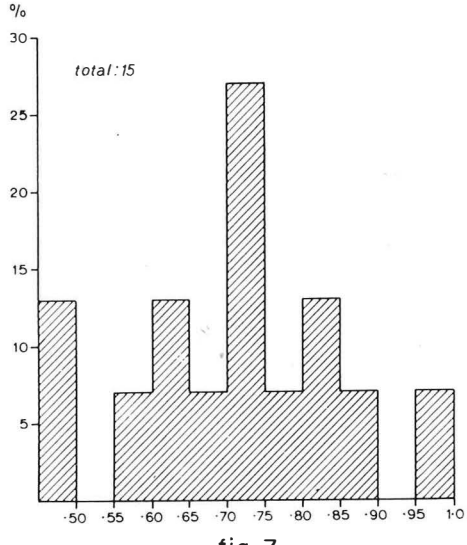

fig. 7

Fig. 6. Frequency distribution of breadth/length ratios of fluted cores.
Fig. 7. Frequency distribution of thickness/breadth ratios of fluted cores.

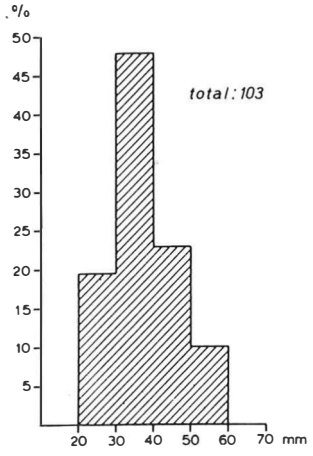

fig. 8

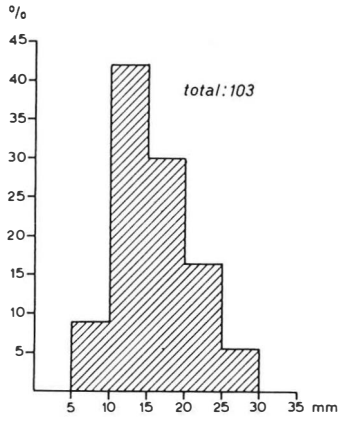

fig.9

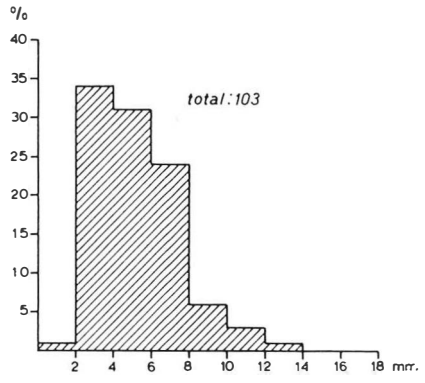

fig. 10

Fig. 8. Frequency distribution of lengths of blades.
Fig. 9. Frequency distribution of breadths of blades.
Fig. 10. Frequency distribution of thicknesses of blades.

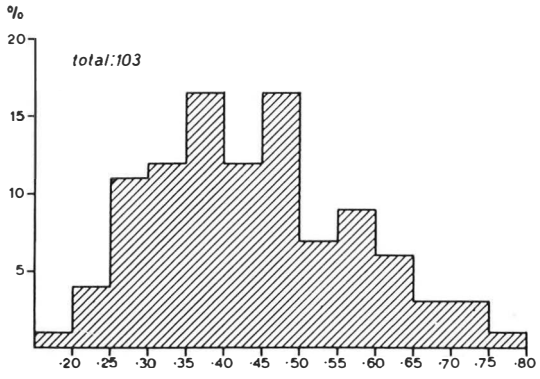

fig. 11

Fig. 11. Frequency distribution of breadth/length ratios of blades.

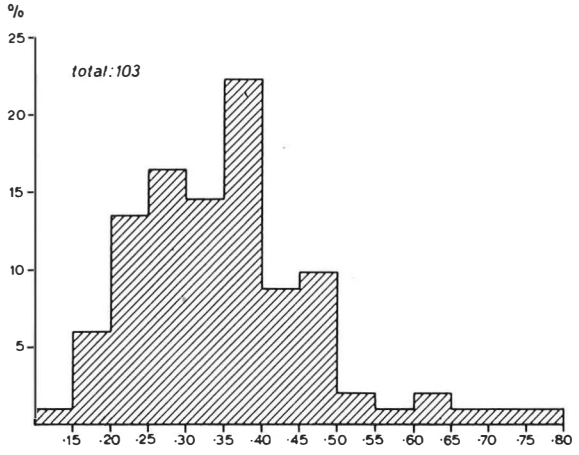

fig. 12

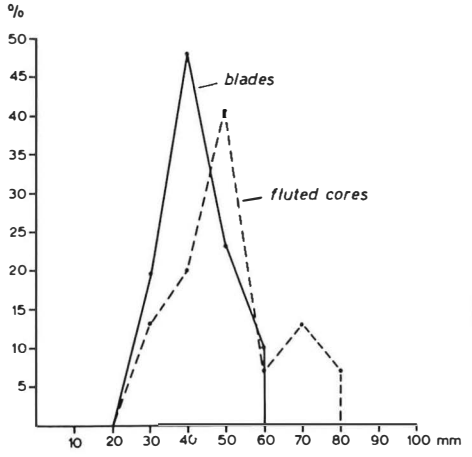

fig. 13

Fig. 12. Frequency distribution of thickness/breadth ratios of blades.
Fig. 13. Comparison between lengths of fluted cores and blades. Note the increasing divergance in the modes of the two categories of artifacts.

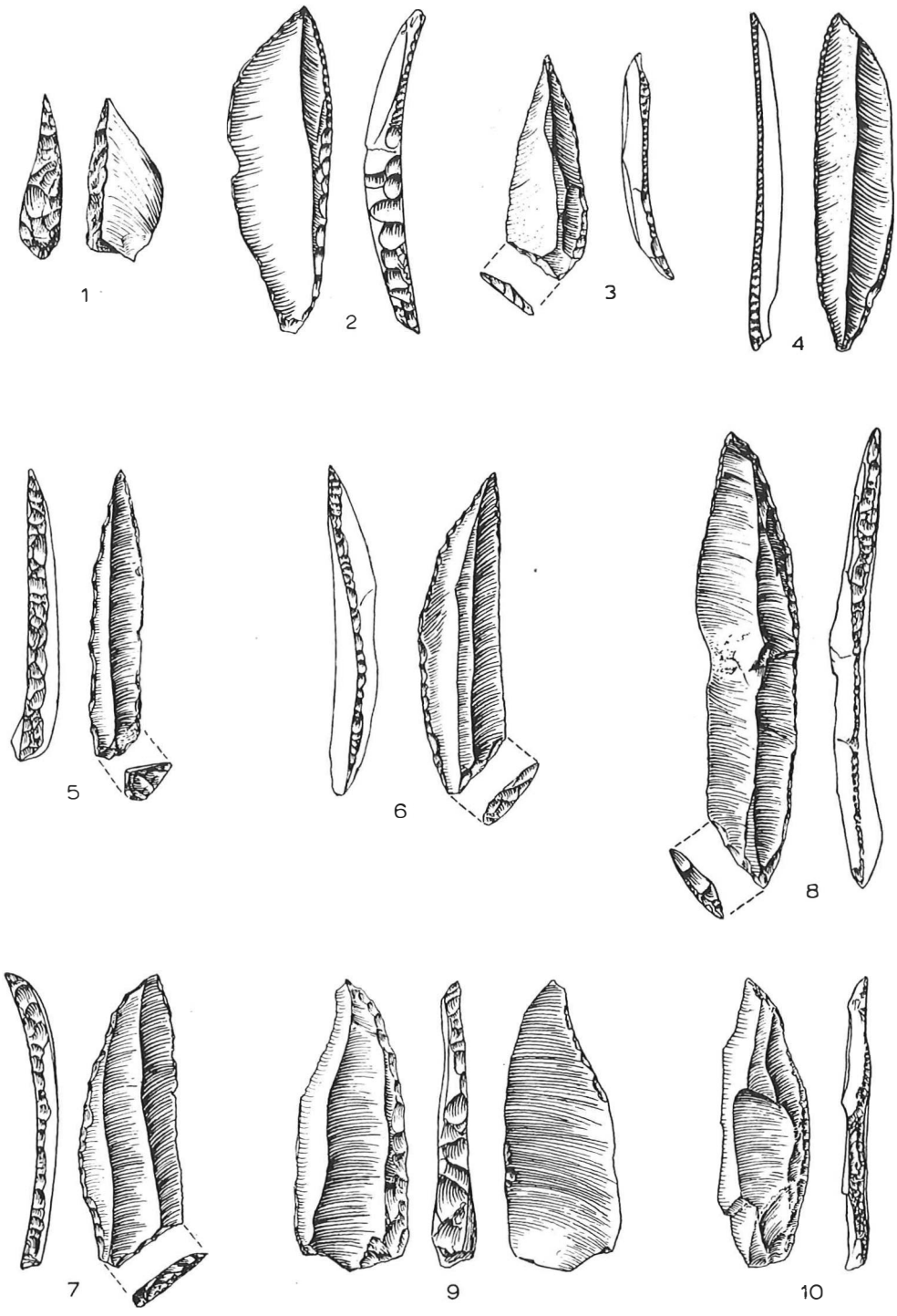

Fig. 14. 1-8, Gravette points; 9 and 10, Tjonger points. Actual size.

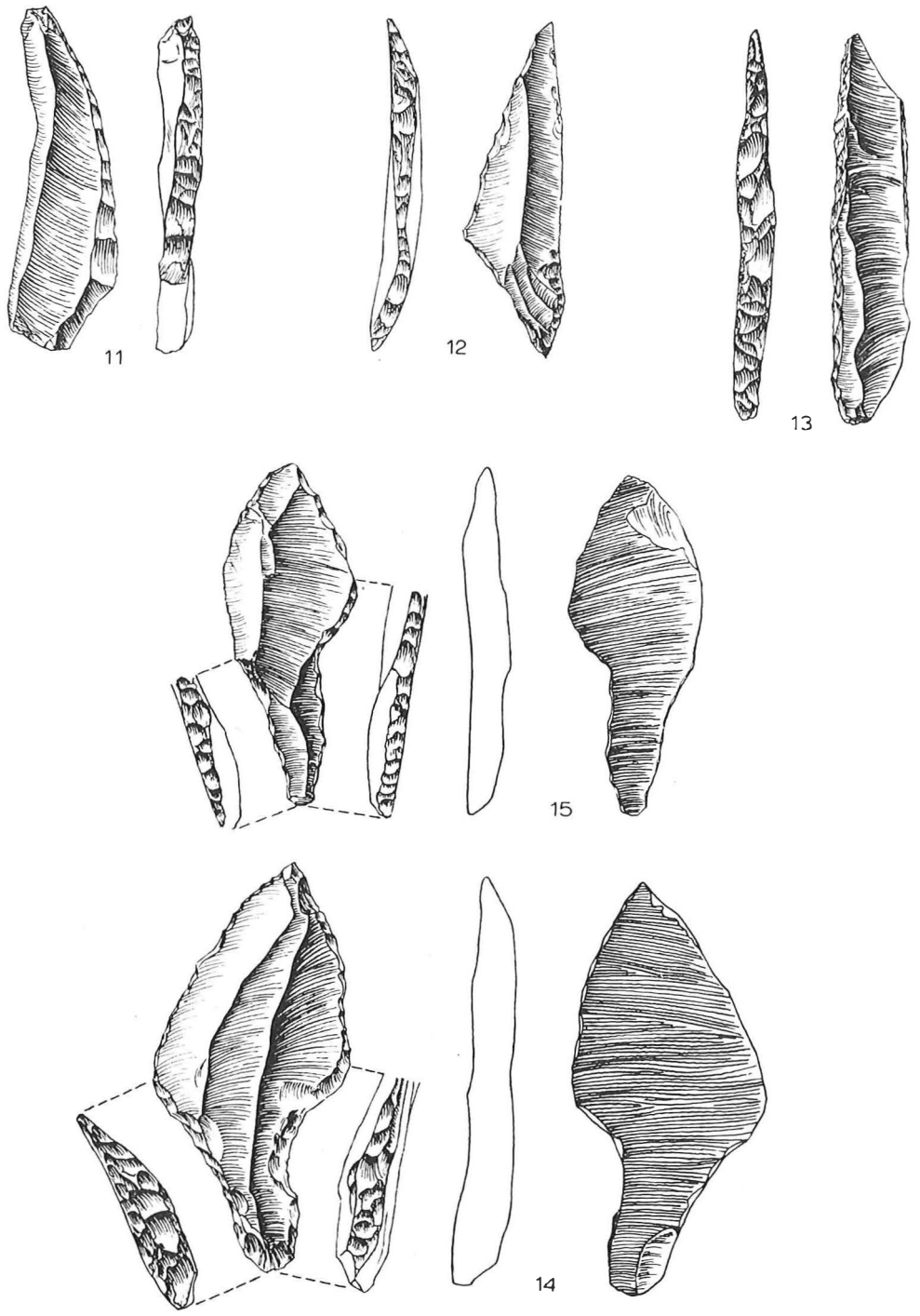

Fig. 15. 11, Tjonger point; 12, Shouldered point; 13, Backed blade; 14 and 15, Tanged points. Actual size.

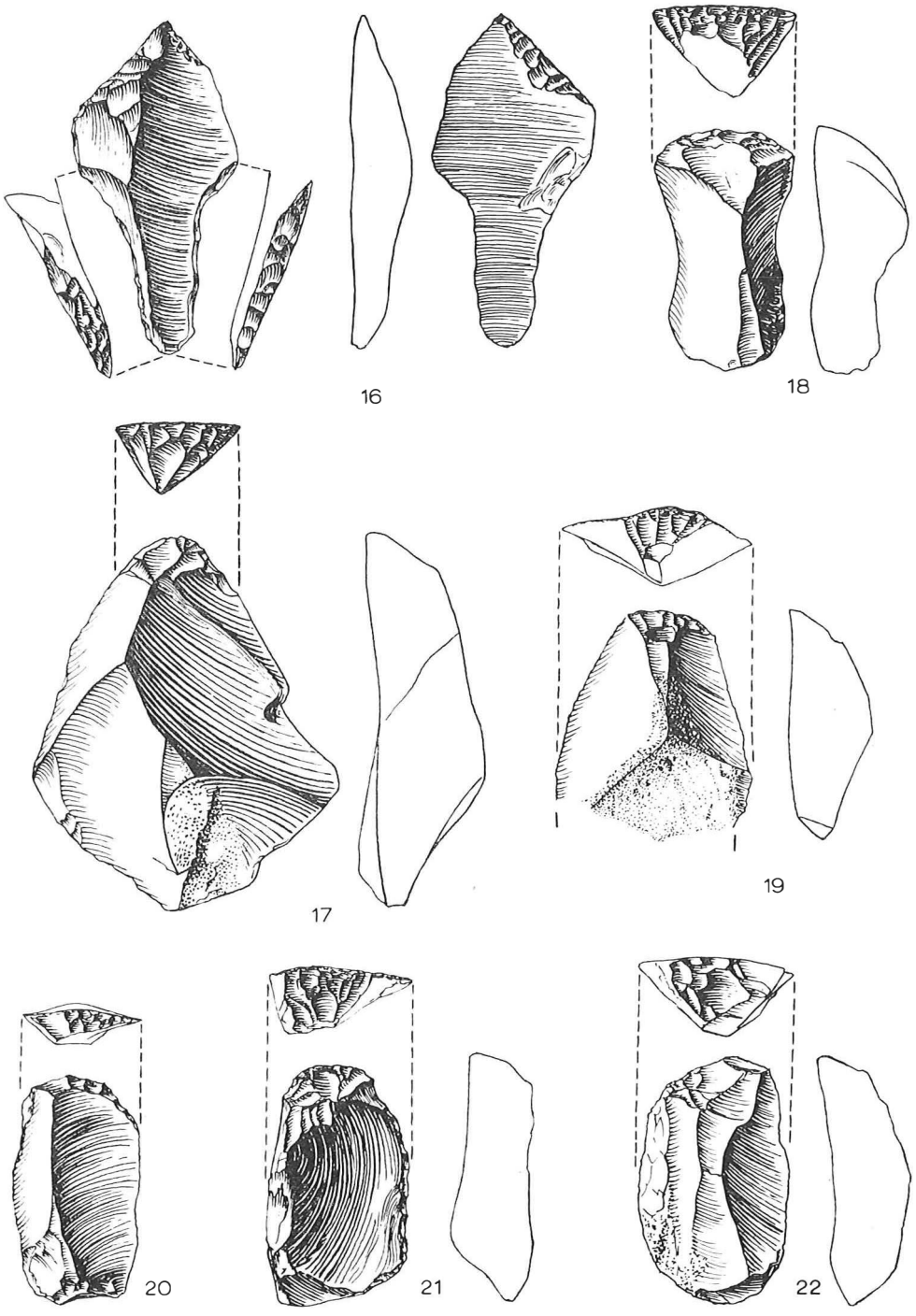

Fig. 16. 16, Tanged point; 17-22 End-scrapers. Actual size.

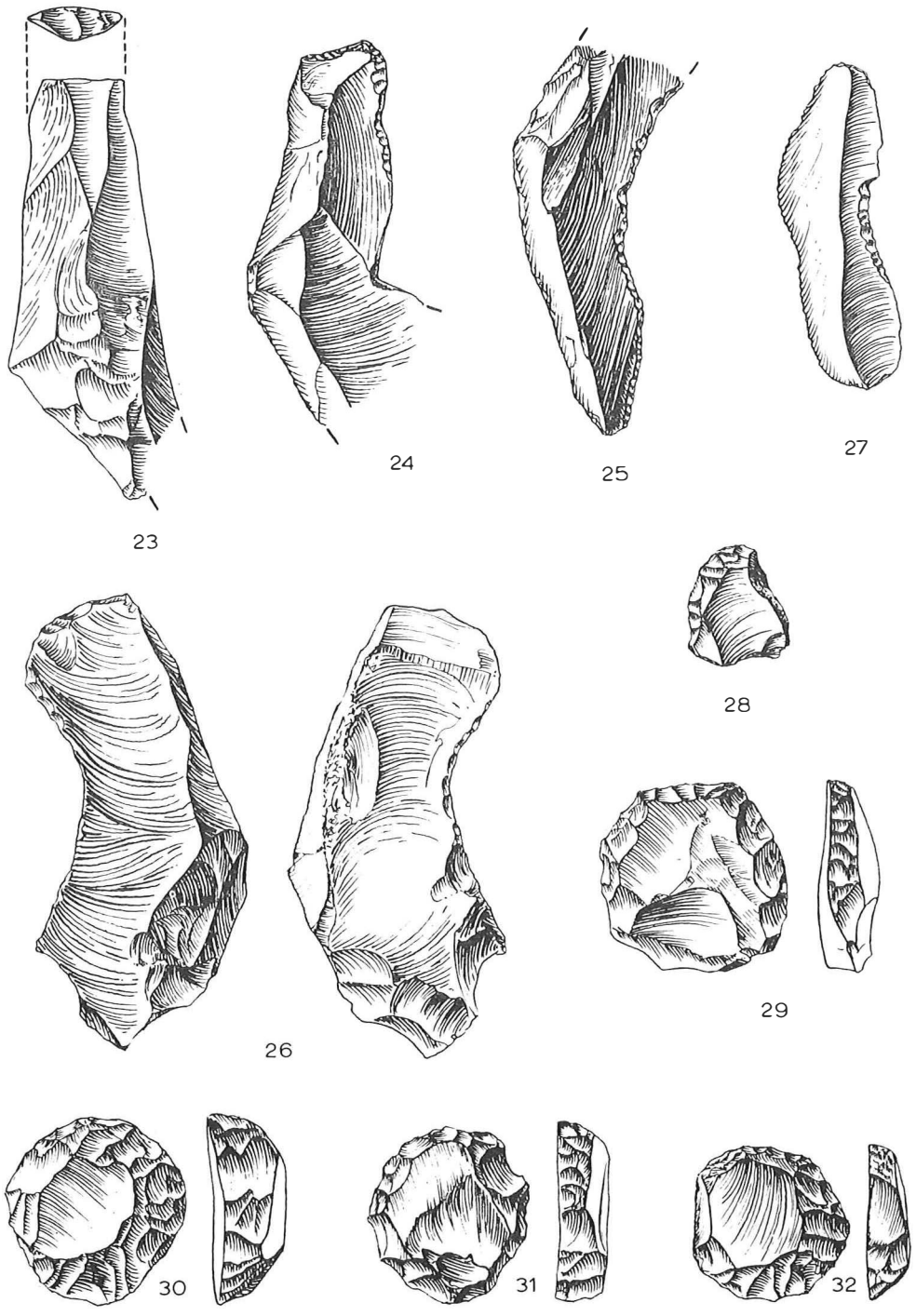

Fig. 17. 23 and 24, Square-ended scrapers; 25 and 26, Concave scrapers; 27, Notched scraper; 28, Convex scraper; 29-32, Discoidal scrapers. Actual size.

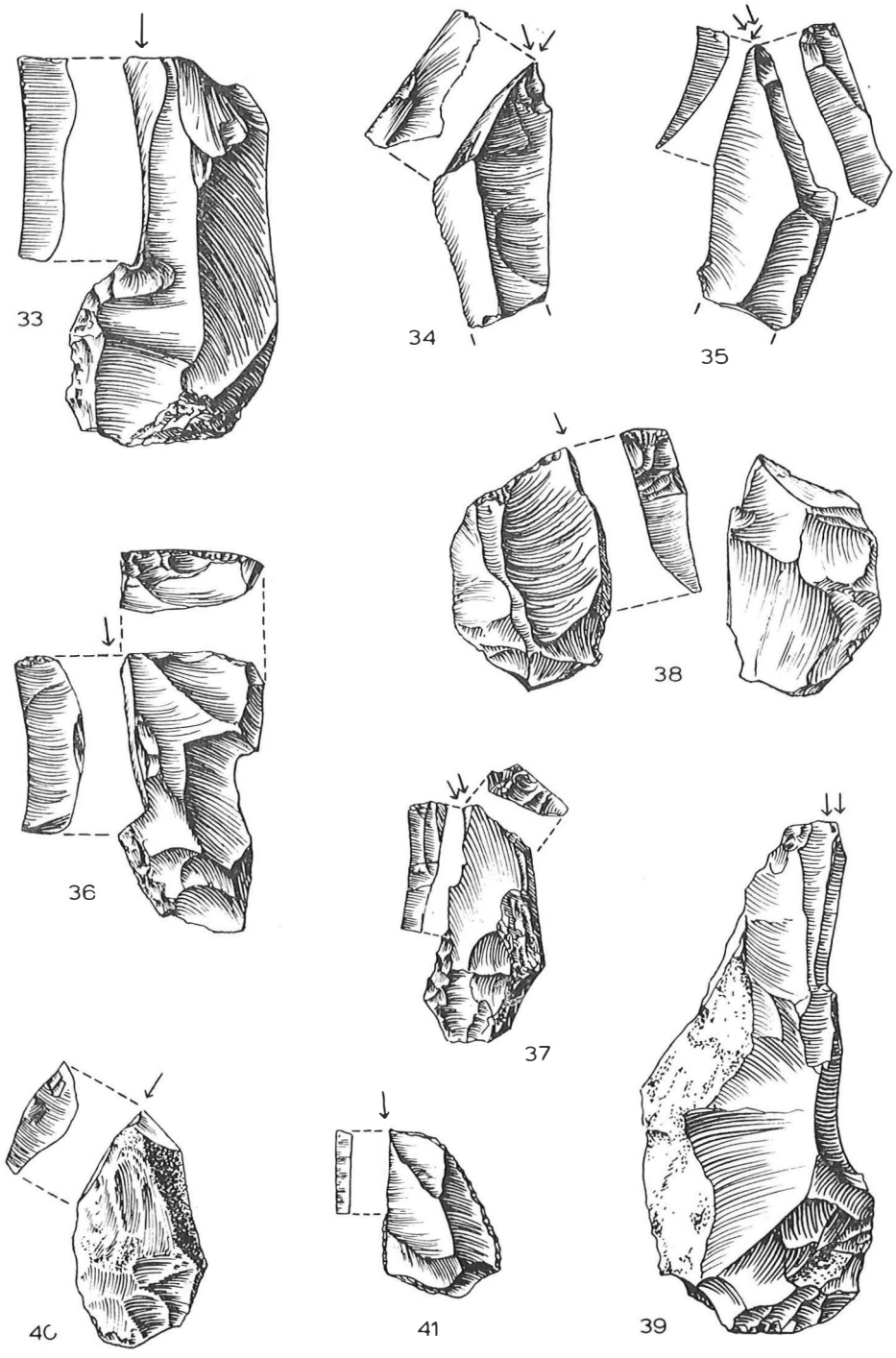

Fig. 18. 33, Single-blow burin; 34, *bec-de-flute* burin; 35, Polyhedric burin; 36-40, Angle burins; 41, Parrot-beak burin. Actual size.

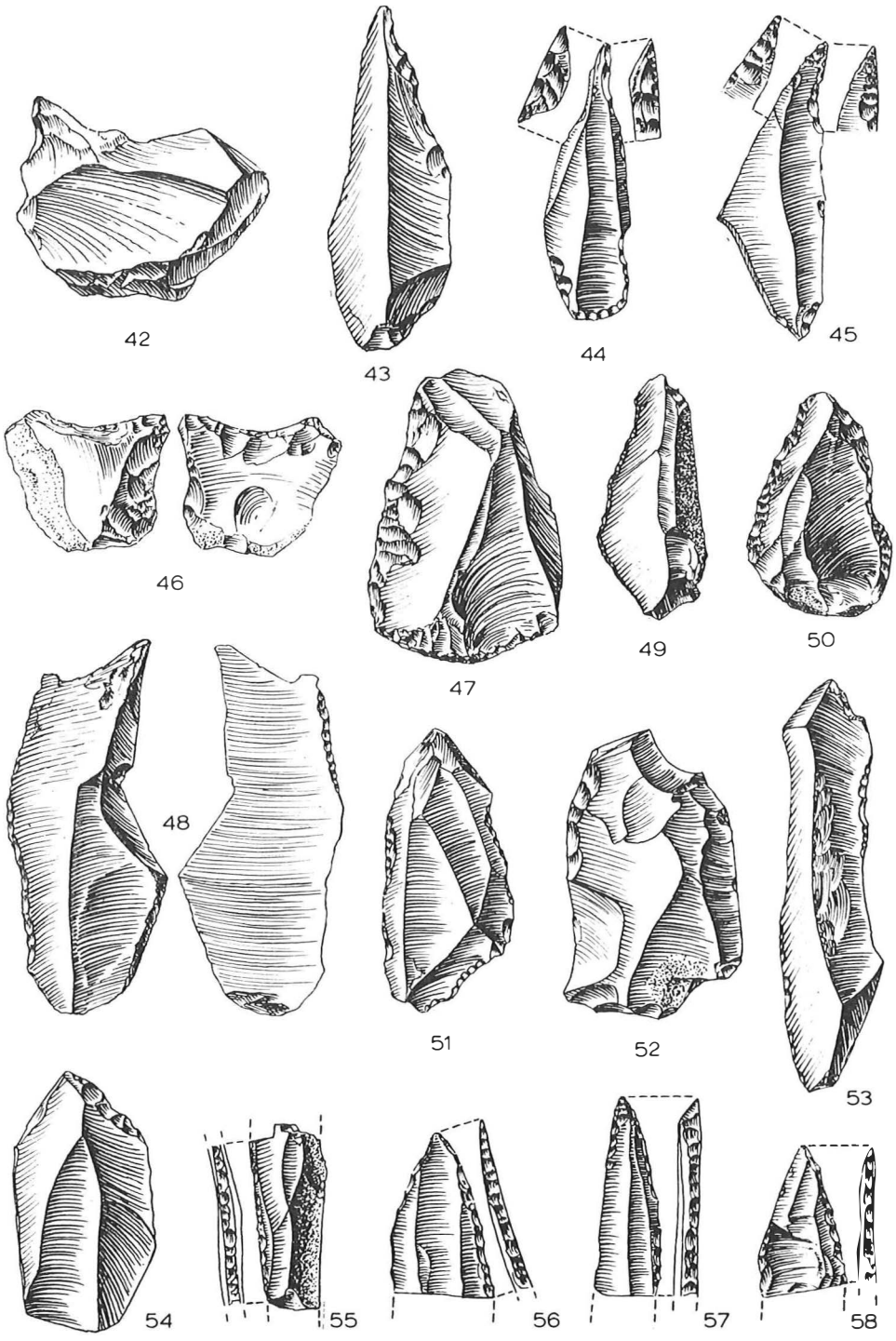

Fig. 19. 42-6, Perforators; 47-54, Retouched blades; 55, Backed blade (incomplete); 56-8, Upper portions of Gravette points. Actual size.

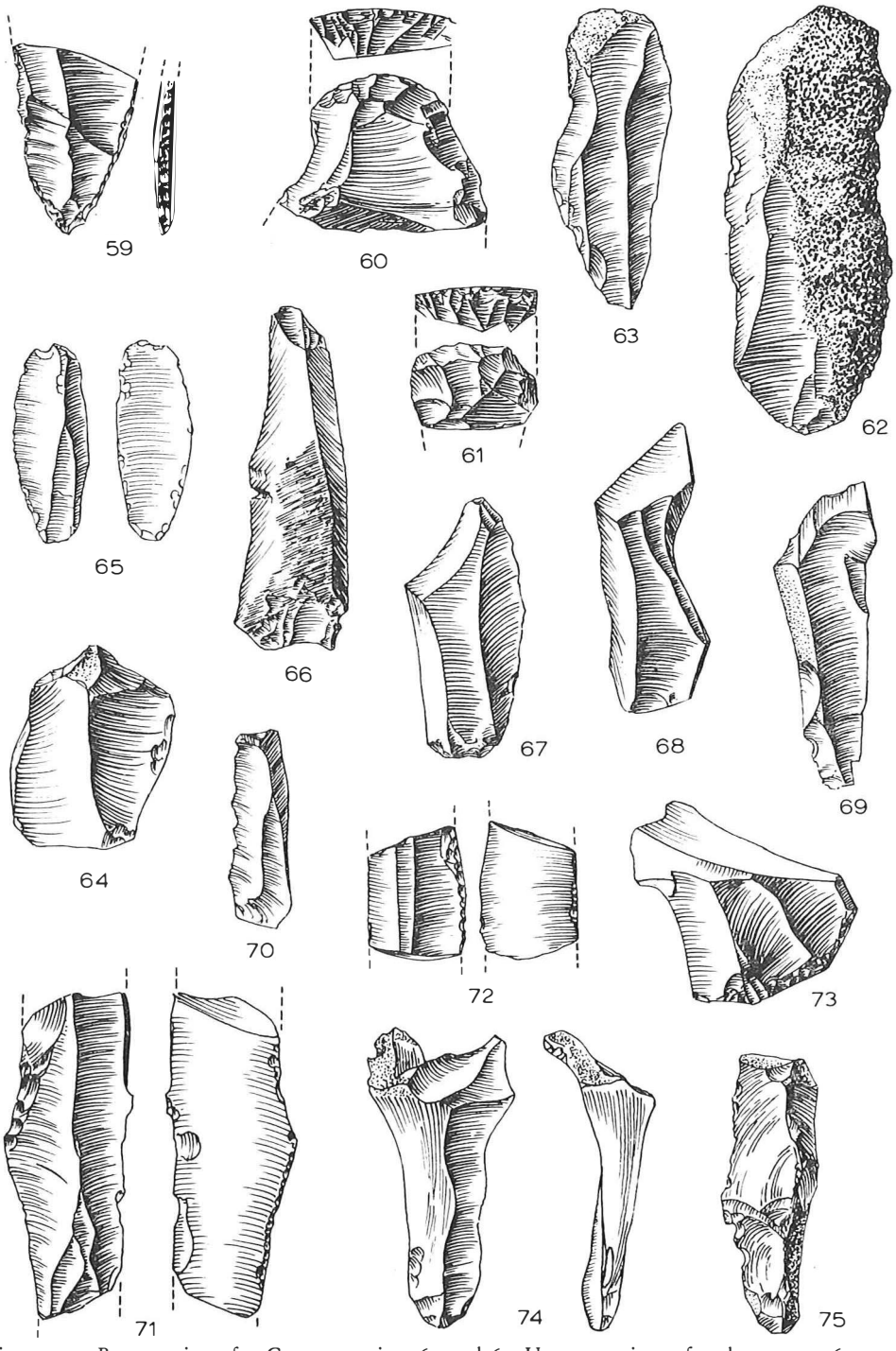

Fig. 20. 59, Butt portion of a Gravette point; 60 and 61, Upper portions of end-scrapers; 62-70, Unworked blades; 71 and 72, Blade sections with retouch 73-5, Core rejuvenation flakes. Actual size.

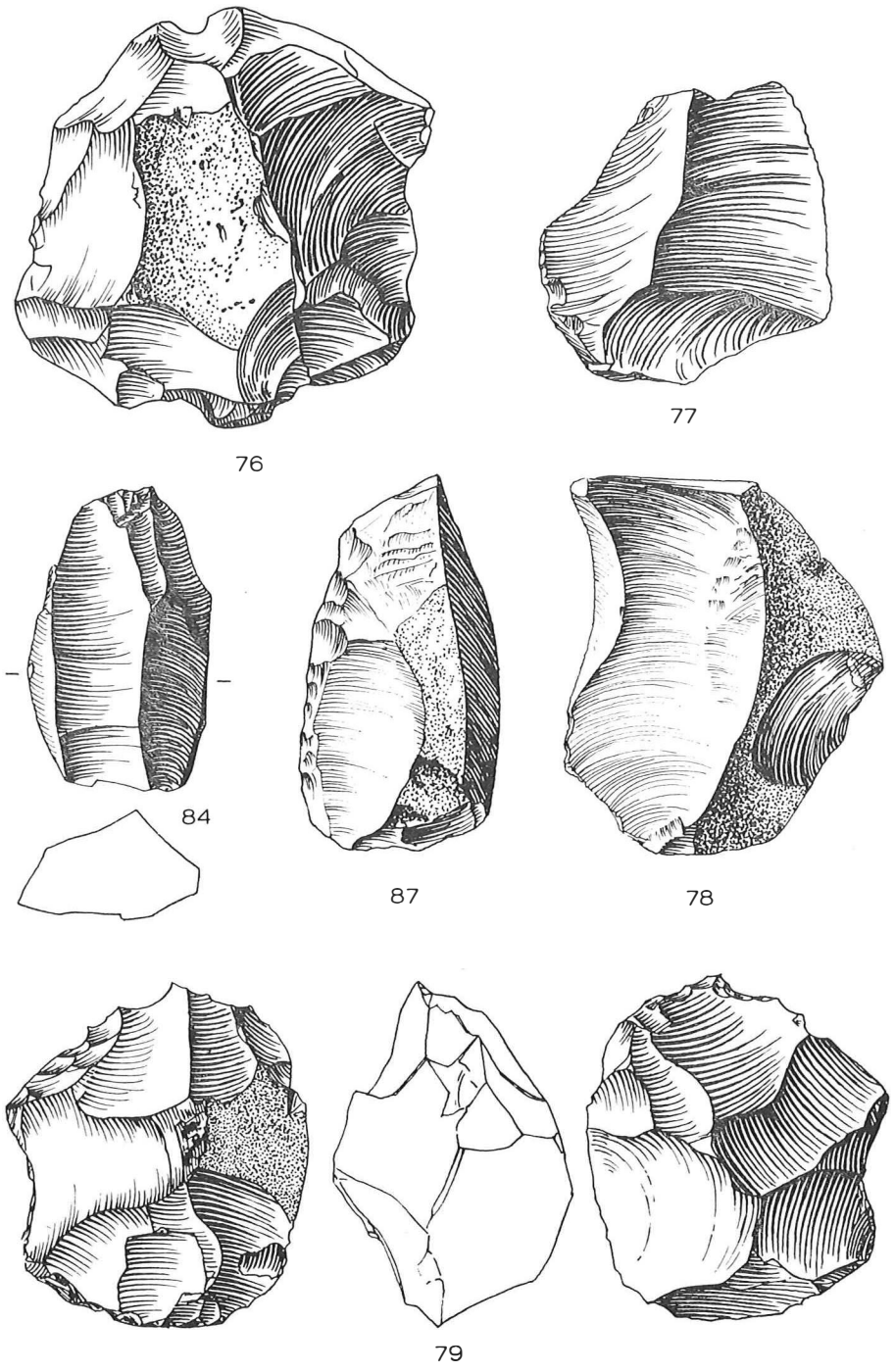

Fig. 21. 76-8, Unworked flakes; 79, Discoidal core; 84, Fluted core worked in opposite directions; 87, Fluted core with scraper retouch. Actual size.

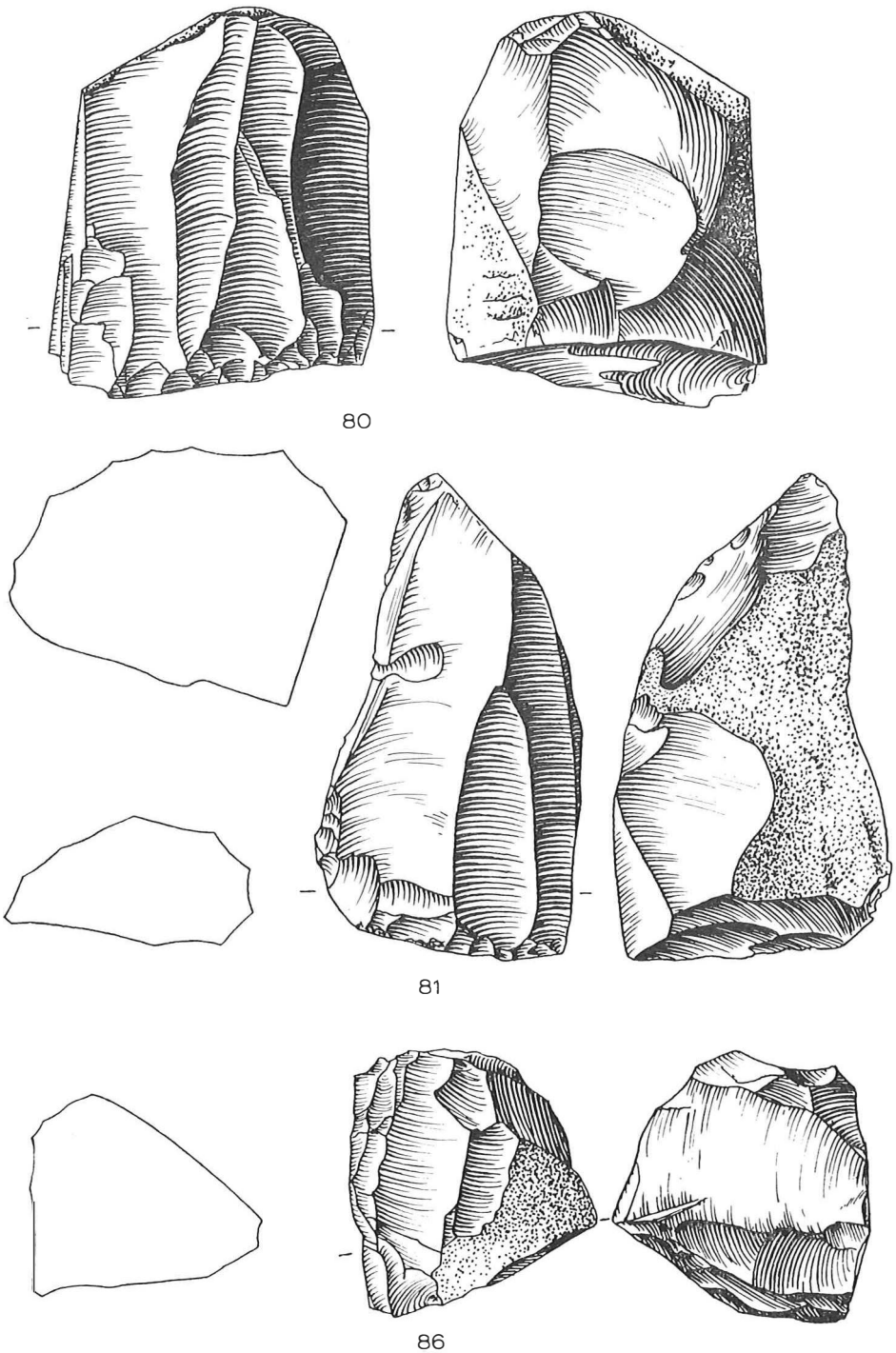

Fig. 22. 80 and 81, Fluted cores worked in one direction; 86, Fluted core worked at right angles. Actual size.

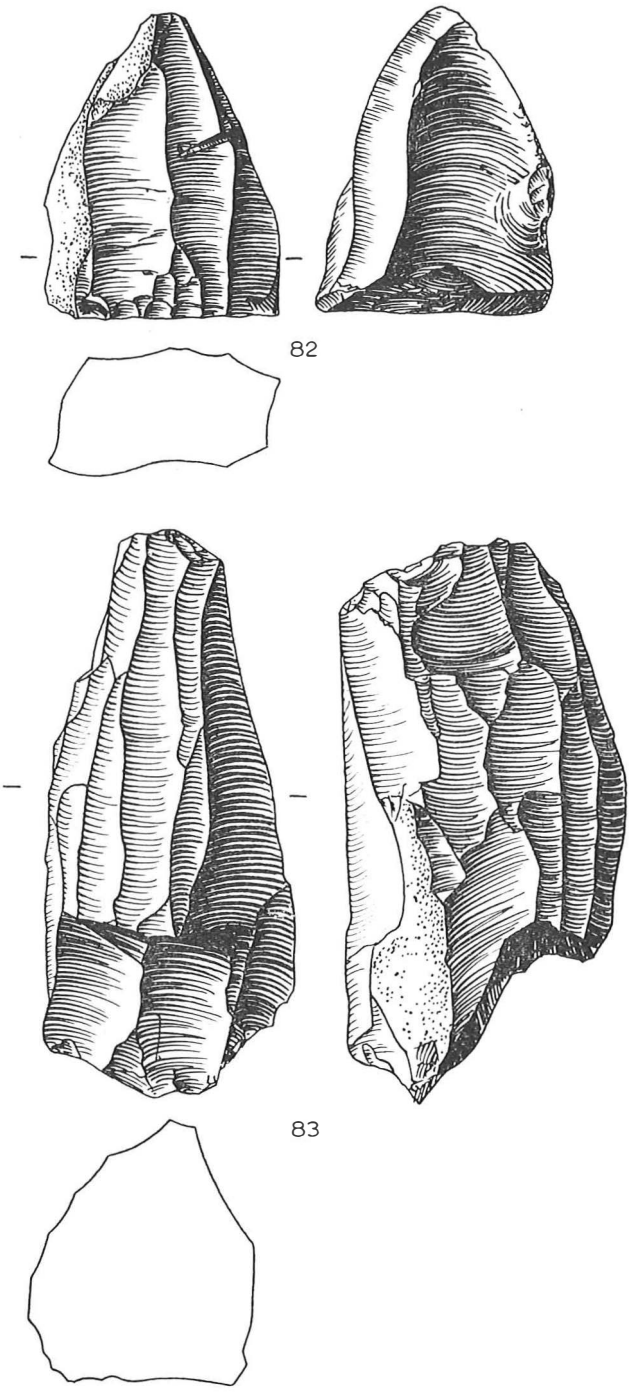

Fig. 23. 82, Fluted core worked in one direction; 83, Fluted core worked in opposite directions. Actual size.

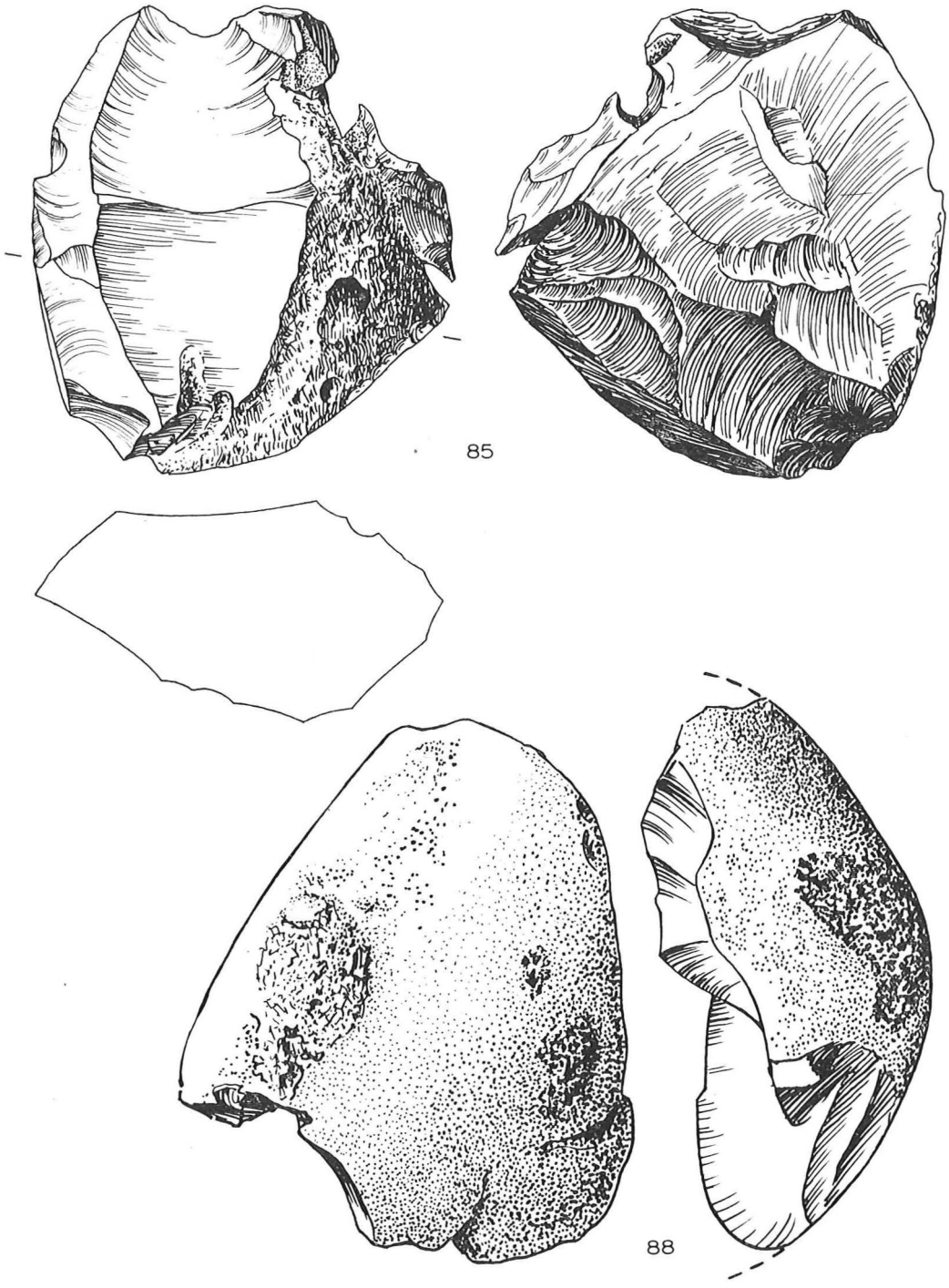

Fig. 24. 85, Fluted core worked in opposite directions; 86, Flint nodule (incomplete) showing batter marks. Actual size.