The Ninevite 5 Chipped Stone Assemblage from Tell Leilan: Preliminary Results

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Introduction

The present paper can be viewed as a pilot study for the investigation of the chipped stone assemblages from Tell Leilan in terms of technology and function. Although lithic material from historic sites is generally not considered a relevant source of information (cf. Hanbury-Tenison 1983, 1986; Miller 1985; Rosen 1983, in press), the analysis of flint and obsidian can provide answers to certain questions concerning economic base, exchange patterns or, if a large enough area is exposed, activity loci within a site. The long sequence recovered at Tell Leilan, from late Northern Ubaid through the early second millennium B.C., creates the possibility to study changing attitudes towards lithic tools as a result of the introduction of metallurgy (cf. Rosen 1984). Secondly, differences in the manner of acquisition of raw material, the loci of tool manufacturing, and the search for distribution centers for certain products, can theoretically illuminate the intensity and character of trade relations. Finally, the analysis of, for instance, the sickle-blades may shed light on the alleged increase in agricultural production towards the end of the Ninevite 5 period (cf. Weiss 1988: 15).

Composition of the sample

The material studied so far comprises all Leilan Period III chipped stone artefacts from Operation 1 (N= 79). Because it is impossible to draw conclusions about the significance and meaning of our observations unless we compare several units, it was decided to include the lithics from Period IV (Late Uruk; N= 53) and Period V (Early Uruk; N= 67) as well. Regrettably, virtually no Period II material was excavated in Operation 1 (see below); conclusions about possible differences between Period III and Period II chipped stone assemblages must await the analysis of samples from the other operations.

All artefacts from Periods V-III in Operation 1 (1979 and 1980 campaigns) were described morphologically (see next paragraph). Thirty implements from the Period III assemblage were selected for usewear analysis, comprising all unburned flint implements except the very small unretouched fragments. Furthermore, all sickle-blade segments from Period IV-V were analyzed. The artefacts produced on obsidian (about a third of the chipped stone (Fig. 1)) could not be examined for traces of use because the character of wear traces on this material differs considerably from that on flint. It would require a considerable number of experiments using obsidian tools to gain enough expertise with the interpretation of wear traces on this material. Hopefully this research can be developed in the future, especially as previous usewear analyses of obsidian seemed to yield promising results (Hurcombe 1986; Vaughan 1981).

Technology and morphology

The chipped stone assemblages from Periods V-III exhibit a duality between well-manufactured tools such as sickle-blade segments and what elsewhere has been called the *ad hoc* component (Hanbury-Tenison 1986; Rosen in press). The latter includes small flake artefacts which were produced in an unsystematic fashion.

Every implement was described according to raw material, metrical attributes, degree of burning, primary technological classification, amount of cortex present, grain size of the raw material, breakage pattern, and signs of hafting (presence of remains of bitumen). In addition several other technological features were recorded, but they will not be discussed here as the sample is yet too small to judge the variability present; for example "manner of percussion" is a statistical variable because it is based on a combination of features, the assessment of which may lead to an incorrect interpretation of any individual piece (contrary to the determination of the amount of cortex present, which is more objective).

Raw material

It has already been mentioned that about 2/3 of all the artefacts was manufactured on flint (Fig. 1). Roughly speaking two varieties are present. First, much of the *ad hoc* component was produced of a rather chalky, irregular, somewhat coarse-grained flint. The nodules are of very small size (diameter c. 4 cm) and probably derive from streambeds at the foot of the Taurus mountains, not far north of the site. Their provenience still needs to be verified. The sickle-blade segments on the other hand were manufactured on homogeneous high-quality flint, generally finer-grained. The nodules must have been of considerable size. However, amongst the excavated material no nodules, blade cores or debitage of this raw material category were found, suggesting that the sickle-blade segments were imported as finished products (see also the section on breakage pattern). The source of this high-quality flint is not known. The same uncertainty about source applies to the obsidian. No obsidian cores were retrieved; it is too early to say whether this is due to sampling error or to transport of finished products instead of raw material.

There seems to be no quantitative difference between the three periods with respect to the kind of raw materials used. Period V however has yielded less pieces with cortex (Fig. 2) and no pebble fragments (Fig. 3). This could mean that there is less local manufacture of *ad hoc* tools in Period V, but of course the data may be biased as a result of sampling.

Metric attributes

If we look at the metric aspects of the artefacts across the three periods, certain differences are apparent (Table 1). Generally speaking the size of the artefacts seems somewhat larger in Period III than in the other periods. The low mean weight of the artefacts from Period V is probably due to the virtual absence of pebbles from this assemblage.

	Period V		Period IV		Period III	
	tot.	s.bl.	tot. segm.	s.bl. segm.	tot.	s.bl. segm.
length	2.73	3.18	2.78	2.55	3.16	3.93
width	2.13	2.73	2.11	2.13	2.17	2.53
thickness	0.71	0.62	0.71	0.70	0.77	0.75
weight	5.07	-	6.57	-	7.26	-
	N=67	N=14	N=53	N= 4	N=79	N=13

- Table 1: Metric attributes (length, width and thickness in cm, weight in g) of all chipped stone artefacts from Periods V-III (Operation 1), differentiated between total assemblage (tot.) and sickle-blade segments (s.bl.segm.).

Burning

The number of burned artefacts is very high: 41.3% of the Period V assemblage and 34.5% of the Period III assemblage. Period IV has yielded relatively few burned flints (15.2%) (Fig. 4). In addition to the artefacts exhibiting heavy traces of burning (which include some sickle-blade segments), several *ad hoc* implements possess lustrous fractures, which might indicate the practice of heat-treatment (Seitzer Olausson 1983).

Breakage patterns

This feature pertains especially to blades: by definition blades are long and narrow, and therefore suitable for breaking into a number of fragments, which may serve as blanks for various small or composite tools. It is noteworthy that there are relatively many medial fragments in the Period V and Period III assemblages (Fig. 5). All Period III sickle-blade segments concern medial fragments, while from Period V 10 out of 14 such tools were produced on medial sections. Likely reason for this preference is that medial fragments form the straightest part of blades, and therefore are most easily fitted into a haft. Whether the sickle flints were imported as finished products, *i.e* in broken state, or whether entire blades were traded, only to be broken up in lithic workshops within the settlement, is as yet difficult to ascertain. The few blades on obsidian display no evidence for systematic breakage patterns.

Primary classification

The primary classification of artefacts pertains to the relative frequencies of blades, flakes, cores, waste, crested blades, decortification flakes and pebbles (Fig. 3). This tells us about the reduction sequence and what sort of category was considered an appropriate blank for subsequent modification (retouch) into a tool. It is noteworthy that cores occur rarely in all periods. However, pebbles and pebble-fragments are frequent in the Period IV strata, less so in Period III levels, and absent in the Period V assemblage. During all periods blades were preferred above flakes, especially in Period V and Period III. The high frequency of blades is partly due to the numerous sickle-blade segments retrieved from these strata: these are much more conspicuous (and larger) than the flakes and debitage of the *ad hoc* component, and therefore stand a better chance of being collected during excavation.

Hafting

Hafting traces (Fig. 6) were only observed on sickle-blade segments. They include remnants of bitumen (Fig. 7a) and steep intentional retouch along one lateral edge ("backing") (Figs. 7b, 8b). Bitumen was present throughout the levels under consideration (Period V-III): it was attested on 23 of the 31 sickle-blade segments. One tool even displayed remnants on two edges (Fig. 10). "Backing", however, seems largely to be confined to the sickle-blade segments from Period III: only one implement from Period V (str. 49) displayed this feature, as compared to six from Period III (from a total of 13). Instead of "backing" two specimens from Period III had an obtuse edge angle (Fig. 8a), which probably had the same purpose, i.e. a more stable fixture and preventing the haft from being damaged by the sharp flint edge. Of the 13 sickle-blade segments present in the Period III assemblage, five were secondarily retouched to such an extent that the presence of "backing" could not be ascertained. No macroscopically visible hafting traces were seen on obsidian tools.

Tool typology

Sickle-blade segments

The most important standardized tools in the Operation 1 assemblages constitute the sickle-blade segments (N= 31). The blanks used for their manufacture resemble the so-called Canaanean blades. No complete blades with sickle-gloss ("reaping knives" in Rosen 1983) are present. Such specimens do figure for example in the late Uruk assemblage from Jebel Aruda (Hanbury-Tenison 1983). Characteristics of the Canaanean blade technology include a deep negative bulb of percussion, a trapezoidal cross-section, a facetted platform, an average length of 10 cm, a width of 1.5-3.0 cm, and a thickness of less than 0.5 cm (Hanbury-Tenison 1983; Rosen 1983, in press). Rosen assumes that the blades were produced with a punch via indirect hard hammer percussion; the segments (4-6 cm long) could have been hafted in groups of 5-6 to create a composite sickle.

From Tell Leilan a slightly different picture emerges. First of all, the characteristic deep negative bulb of percussion was absent on the three proximal segments present (Fig. 9). Moreover, a mere 12 of the 31 sickle-blade segments under consideration possessed the typical trapezoidal cross-section (six from the Early Uruk levels, one from the Late Uruk, and five from the Ninevite 5 strata), whereas ten fragments had a triangular section (five, both from Period V and Period III). On the remaining blade fragments this feature was more irregular. Two of the three proximal fragments present indeed showed a facetted platform (Fig. 9), while the platform from the other one had been partially removed by secondary retouching.

The metric aspects of the Leilan sickle-blade segments also do not entirely conform to the criteria for Canaanean blades. Rosen (in press) asserts that typical Canaanean blade fragments generally are 4-6 cm long. The mean lengths of both the early Uruk blade fragments (3.2 cm) and the Ninevite 5 ones (3.9 cm) are on the low side, the 2.6 cm average for the late Uruk segments certainly is. The average thickness of the Period V pieces amounts to 0.6 cm (range 0.3-0.9 cm), of the Period IV segments to 0.7 cm (range 0.2-1.7), and that of the Period III implements 0.8 cm (range 0.5-1.2 cm). Especially the latter are much too thick compared to typical Canaanean blades. The mean width of the Leilan blade fragments, however, conforms well: 2.7 cm for Period V, 2.1 cm for Period IV, and 2.6 cm for Period III. Average edge-angle for the Period V sickle-blade segments amounts to 34 degrees, for Period IV 43 degrees, and for Period III 42 degrees. None of the blades were serrated although several were secondarily resharpened. Despite differences the overall impression of the Leilan blade fragments is one of similarity to Canaanean blades.

Fan-scraper

Another diagnostic tool is a fan-scraper from strata 43-44 (Period IV). It concerns an uncomplete specimen, broken both lengthwise and across. Its preserved length amounts to 5.3 cm, its width 6.0 cm and thickness 1.1 cm. The implement is produced on relatively coarse-grained homogeneous high-quality flint. The dorsal aspect is entirely covered by smooth cortex. The flake possessed a facetted platform, which had been stabilized by micro-retouching the edge; the flake was probably removed by soft hammer percussion. One lateral edge displays steep scalar retouch. Rosen (in press) considers this tool type another trade-item, besides the Canaanean blades, and suggests a ritual function (see below).

The *ad hoc* component

The *ad hoc* component includes a variety of tools, all of them very roughly made and therefore rather difficult to classify according to standard typological categories. From Period III, a blade with a burin-facet is one of the more interesting artefacts (str. 28a). Several flakes and blades exhibit tiny irregular retouch, perhaps attributable to use. In addition, some crudely made unretouched blades and blade-like flakes were found. Very little intentional retouch is evident, especially when compared with the preceding periods.

Period IV strata yielded three scrapers, two points, one borer and a few retouched blades. From Period V strata one scraper, and a number of retouched flakes and blades were retrieved; a comparatively high amount of waste was present. From a chronological point of view the amount of implements is still too small to observe trends.

Tools on obsidian

Few retouched tools had been produced on obsidian. From Period V four blades with retouch smaller than 1 mm were retrieved, whereas the remaining artefacts displayed no modification. Stratum 41 (Period IV) has yielded a convex scraper and one blade with small retouches. In Period III the large majority of the obsidian artefacts exhibits no retouch.

Functional analysis

Introduction

Usewear analysis is a relatively new method to infer the function of artefacts from observable traces of wear, instead of using simple form-function analogies or sheer speculation. Traces of wear include edge-removals, striations, polish and edge-rounding. Under certain circumstances residues of the ancient contact materials are still present, but at Leilan the pedological conditions appear unfavourable for their preservation. The method employed here is basically the one outlined by Keeley (1980), generally referred to as microwear analysis. Use was made of an incident light microscope (Nikon optiphot) with magnifications ranging from 50-560x. Although Keeley advocates an extensive cleaning procedure of the archaeological implements, involving treatment with a 10% HCl and a 20-30% KOH or NaOH solution, this was omitted for the majority of the pieces as HCl can dissolve the surface of more chalky varieties of flint. Most artefacts were therefore only soaked in soapy water and cleaned with alcohol to remove fingerprints and other impurities. A few flints were treated according to the standard cleaning procedure as described by Keeley, because they exhibited a uniform sheen over their surface which was thought to represent a mineral deposit.

Presently many methodological problems haunt microwear analysis (Bamforth 1988; Hurcombe 1988; Newcomer et al. 1986; Unrath et al. 1986). Contrary to what was commonly believed at the outset, polish types are not always distinctive and attributes sometimes overlap. Moreover, post-depositional surface modifications have affected very many assemblages or parts thereof. These modifications are sometimes difficult to distinguish from real use-polishes. It was also insufficiently realized that the analysis of wear traces takes place by formal analogy to experimentally induced traces. We should speak therefore of an interpretation of use instead of an identification. Our interpretation then has a higher or lower probability, depending on the number of similarities between archaeological and experimental traces (in terms of wear attributes and morphological characteristics).

Within the scope of this study no experiments with local materials have been done yet. Instead I relied on the experimental reference collection created for the examination of Dutch neolithic assemblages (N= c. 350). Obviously this implies that the functional inferences presented here have a relatively low probability. Hopefully specific experimentation can be carried out in the future. The present analysis was greatly facilitated by the fact that the majority of the implements displayed a very fresh surface.

The sickle-blade segments

The most important category of wear observed appears to be sickle-gloss, in most instances clearly visible with the naked eye (Figs. 7a, 7b and 9). It was observed on 30 of the 31 sickle-blade segments, one proximal blade fragment from Period III displaying no evidence for use. When examined with a microscope, the polish turns out to be flat and very cratered, constituting a band of 1-18 mm wide (average 7.6 mm). Most likely the gloss can be attributed to contact with cereals, as reeds cause a much more "wet-looking", smooth, and slightly domed polish. It exhibits a clear directionality parallel to the edge, indicating that the tool was used in a cutting motion. Virtually all the blade segments seem to have been heavily used. This is corroborated by the fact that 50% of the implements displays evidence of resharpening. Also, five segments were used on both lateral edges (Fig. 10); this practice is more frequent in Period V (N= 4) than in Period III (N= 1), and absent in Period IV.

The majority of the blade segments shows traces of bitumen, indicating the original presence of a haft: 11 implements from Period V (two of which on both lateral edges), one from Period IV, and 9 from Period III (one implement, from stratum 28, employed on two sides (Fig. 10)). Most probably the segments had been mounted in groups to form composite sickles. The shape of the polished area suggests that the segments were hafted straight and not at an angle (Fig. 7b). On the dorsal aspect the bitumen covers almost the entire surface, leaving a band of c. 3 mm wide along the cutting edge (Figs. 7b and 9).

All in all it seems that the sickle-blade segments were heavily curated, especially in Period V. In this respect, it is perhaps noteworthy that of the six sickle-blade segments from stratum 50 (Period V) three had been used on both lateral edges, whereas one was apparently burned. As it concerns a floor deposit, it can be argued that this area may have functioned as a place to "retool" (*sensu* Keeley 1982) the valuable segments.

A certain variability in the character of the sickle-gloss was observed: there seem to be more cases of rough, striated polish in Period V (Fig. 12), and of somewhat smoother polish on the Period III sickles (Figs. 13a and 13b). Variability in sickle-gloss is a well-known phenomenon and two hypotheses concerning the hinter-lying factors have been put forward. Anderson-Gerfaud (1983) and Juel Jensen (pers. comm.) suggest that the striations and the generally rough character of the polish are caused by the presence of weeds among the cereal stems. Another hypothesis assumes that after domestication more field preparation is done in the form of plowing, hoeing or weeding, resulting in a loose soil; because of this the stems would be covered by dust particles, which would scratch the sickle upon harvesting (Korobkova 1981; Unger-Hamilton 1985, 1988). Remarkably enough Juel Jensen finds that in Danish early-middle neolithic contexts the sickle-gloss becomes smoother as time goes on, while Unger-Hamilton claims the number of striations in the polish to increase from Natufian to PPNB.

However, we should remember that heavily glossed surfaces are softer than the original flint: 6 versus 7 on Mohs' scale (Witthoft 1967: 384). This could mean that implements exhibiting the rough, striated polish version show more post-depositional surface modifications, inflicted after use for harvesting.

It remains problematic that even in experimental context we have not yet been able to identify the factors which are responsible for the observed variability in gloss. Certainly the results of my own experiments do not match the archaeological wear traces in this respect (see Van Gijn 1988 for a description of a series of experiments performed with silica-rich plants). It is common practice to execute experiments in conditions as similar as possible to the supposed prehistoric ones. From this perspective the experiments on which the inferences reported here are based (Van Gijn 1988), are definitely inadequate. Hopefully harvesting experiments can be done in the vicinity of Leilan in the near future.

Palaeobotanical analysis of several Bronze Age sites in northern Syria, such as Selenkahiye, Hadidi and es-Sweyhat, indicates that the grain was cut very low, taking along various species of weeds (Van Zeist and Bakker-Heeres 1985). This means that weeds could have been an influencing factor on polish-formation. If we accept this hypothesis, it would imply that fields were less weed-infested during the Ninevite 5 period.

Scrapers

The one fan-scraper found derives from the Period IV levels. Traces of use were not evident, but this does not necessarily mean that this implement has never been used. Recent experiments make clear that diagnostic traces of wear develop very slowly or not at all on the kind of coarse-grained flint such as the fan-scraper was made of (Unrath et al. 1986; Van Gijn 1986). Especially contact with soft materials like meat, fish, fresh hide or green plants causes very little wear. The possible absence of traces therefore does not automatically negate the suggestion that these scrapers may have functioned in ritual butchering practices (McConaughy 1979 cited in: Rosen in press).

Of the other two scrapers, both deriving from Period III levels, one exhibited no signs of use. The other displayed a band of greasy polish directed perpendicular to the edge; perhaps this tool was used to scrape animal tissue. It should be noted that this latter implement was made on a discarded sickle-blade segment (Fig. 11).

The *ad hoc* component

The following inferences are not based on a specific experimental collection and the remarks must therefore remain tentative until more detailed experimentation can be performed. Only *ad hoc* implements dating from Period III were examined.

One blade-like tool with a burin-facet (str. 28a.; floor deposit) possessed a band of domed, smooth polish interpreted as being the result of contact with wood in a perpendicular motion. A similar polish, again from a transverse action, was encountered on a blade with tiny retouch (str. 35). One unretouched flake (str. 32-33) and a flake with small edge-removals (str. 16), both displaying smooth polish, had perhaps been used on soft plant material. A crested blade (str. 19) and one proximal end of a blade (str. 28a; floor deposit) had been employed in a transverse motion on unidentified material.

The general impression obtained from the usewear analysis of the *ad hoc* component is that most of these artefacts were only very briefly used. They appear to be an expediently manufactured and used part of the assemblage, sharply contrasting with the sickle-blade segments. Most likely it concerns tools for domestic activities.

The 1987 campaign: squares 44W12 and 44X12

In squares 44W12 and 44X12 a total of 33 artefacts were retrieved from Period III strata, while a mere 8 implements could be attributed to Period II. No obsidian was encountered in the sample from Period II, whereas Period III yielded 10 pieces (*i.e.* about one third of the assemblage). Only five implements from Period III showed signs of burning.

The number of sickle-blade segments retrieved is very small: three tools from stratum 14 (Period IIa), and three from stratum 15d-17 (Period IIId). None is very characteristic morphologically speaking. The polish on these implements appears to be relatively smooth.

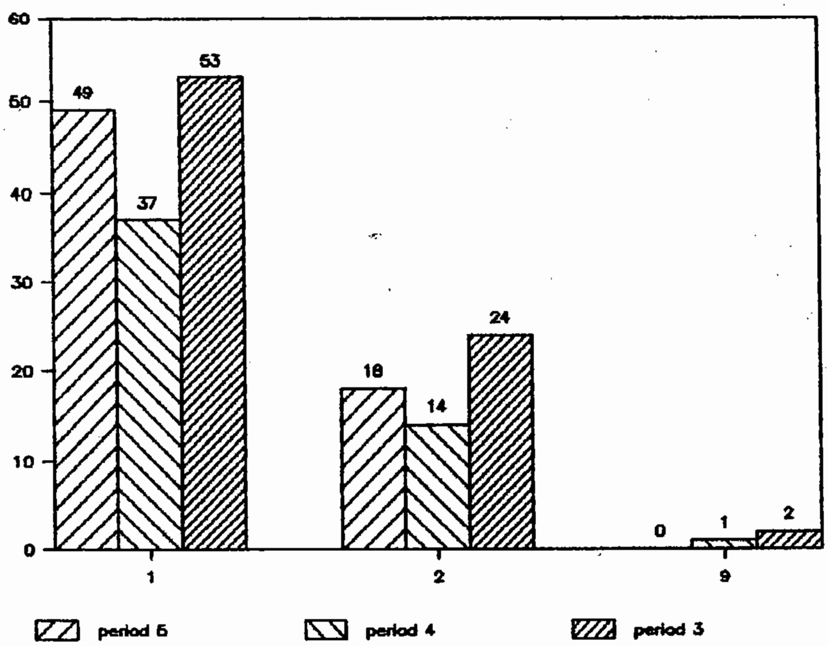
Concluding remarks

Before proceeding it should be stressed that the sample available from the relevant strata is too small to draw unequivocal conclusions. The following should therefore be regarded as tentative and in need of further corroboration.

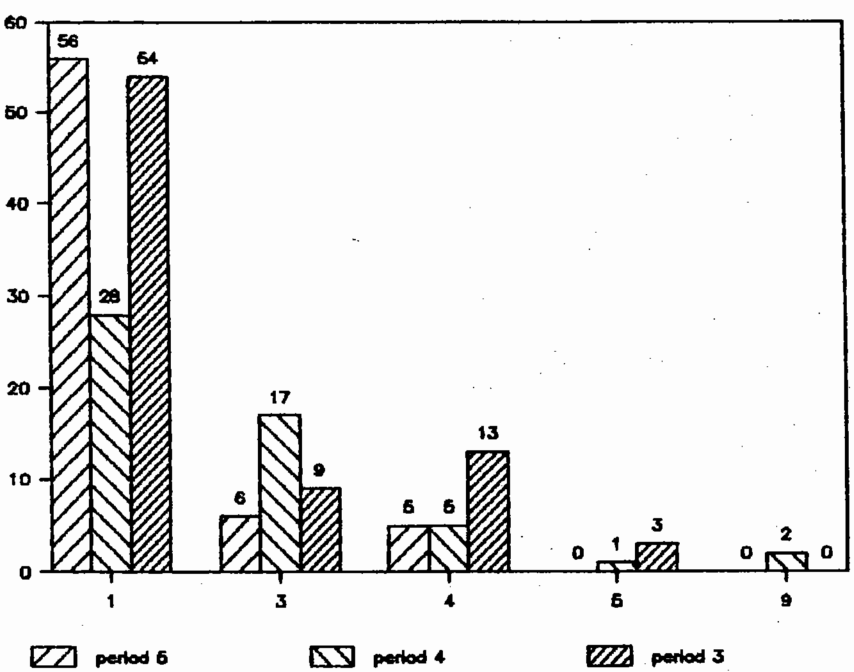
In the assemblages from the three Leilan periods examined, Early Uruk through Ninevite 5, a dichotomy can be observed between the standardized sickle-blade segments versus what is commonly referred to as the *ad hoc* component (Rosen in press). While the former category has been produced on "exotic" flint, the *ad hoc* tools are manufactured from local raw material. The sickle-blade segments, made on blanks very similar to the Canaanean blades, may have been manufactured in specialized workshops, producing for various settlements. We have as yet no evidence for local production at Tell Leilan. On the contrary, sickle-blade segments seem to have been valued items here, apparently in short supply, as is demonstrated by the fact that they were heavily curated: features like resharpening retouch, traces of secondary use, and sickle-gloss on two edges, occur frequently. The *ad hoc* tools, on the other hand, evidently were manufactured in an expedient fashion, as the need arose. They do not display resharpening or secondary use, and the usewear traces were only slightly developed, indicating that they were discarded upon completion of the task at hand.

Few variations in tool morphology could be observed between the assemblages from the three periods. The number of *ad hoc* tools is too small to detect a pattern. Apart from one characteristic fan-scraper from Period IV, the sickle-blade segments constitute the only diagnostic artefact type. Within this general tool category some differences between the three periods can be noted however. The specimens from Period III are generally larger in terms of metric attributes than those from the preceding periods. Whether this is a significant difference has not been determined yet. Furthermore, some Period III sickle-blade segments display "backing", *i.e.* steep retouch on the edge opposite the working edge. This retouch has the dual purpose of providing a more stable fixation and preventing damage to the haft. Where no "backing" retouch is visible, an obtuse angle may be sometimes present, having a similar effect. Whereas eight implements from Period III show "backing" or an obtuse angle, this occurs only once on the Period V tools. The latter usually possess two acute-angled cutting edges which are not further modified. Because "backed" edges are unsuitable for cutting cereals, the sickle-blade segments cannot be turned around in the haft anymore, a practice observed for Period V implements (see above). The number of potential cutting edges was thereby reduced to half. The fact that during Period III one could afford such a practice indicates that the supply of blade-segments was more dependable.

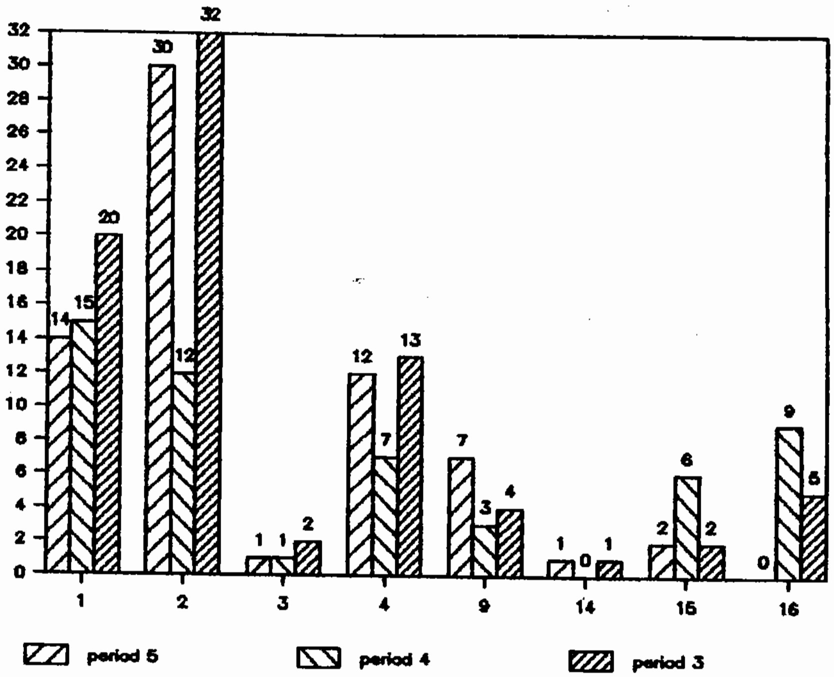
The usewear analysis of the Period III *ad hoc* component and the sickle-blade segments from Periods V-III leads to the following considerations. Although the number of *ad hoc* tools examined was very small, it does appear that these artefacts were employed for a variety of, probably domestic, tasks, like soft plant- and wood-working. It will be interesting to examine *ad hoc* implements from other periods to see if certain functions become obsolete in time. In comparison to the *ad hoc* tools, the use of the sickle-blade segments is very standardized: all served for harvesting cereals. Some variability in the polish can be observed as Period V implements generally display a rougher, more striated polish than those from Period III. Variations in sickle-gloss have been noted before but the causal factors are not clear. If we accept the hypothesis that the roughness and the large number of striations are due to the presence of weeds among the cereal stands (see above), we can conclude that the cultivated fields were better tended during Period III. This may imply an intensification of production in the course of the Ninevite 5 period.



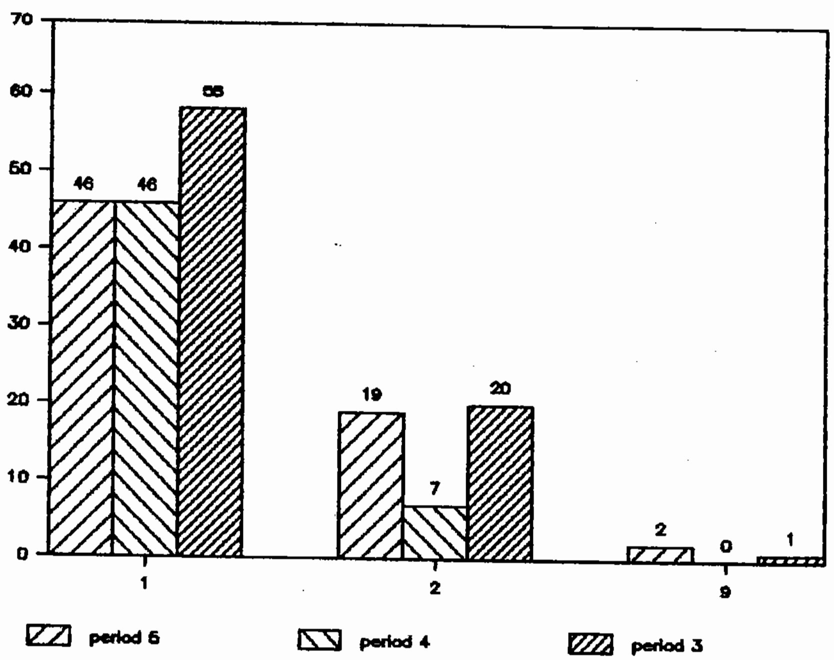
- Fig. 1: Raw material present. 1= flint, 2= obsidian, 9= indeterminable.



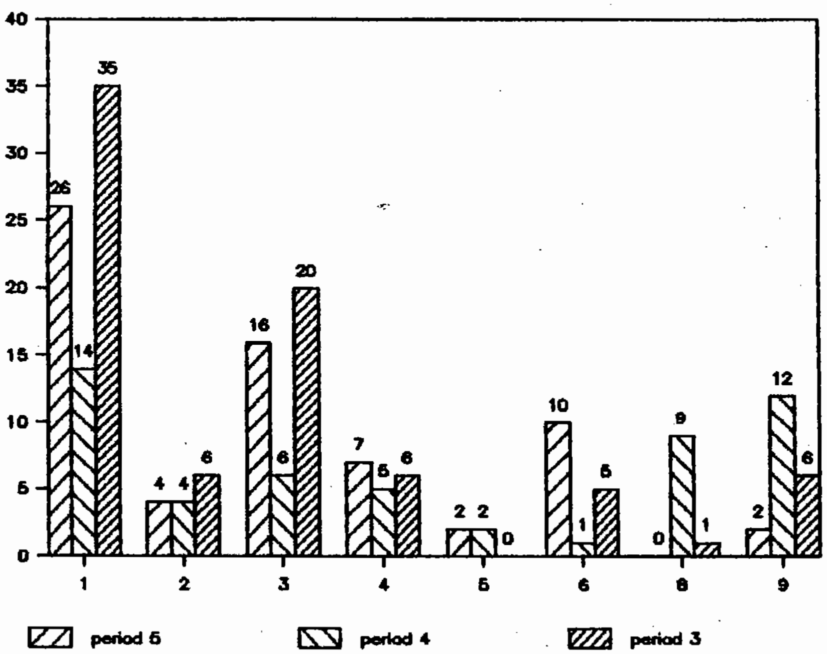
- Fig. 2: Amount of cortex present on the lithic artefacts.
1= absent, 3= dorsal 50%, 4= dorsal <50%, 5= on platform, 9= unsure.



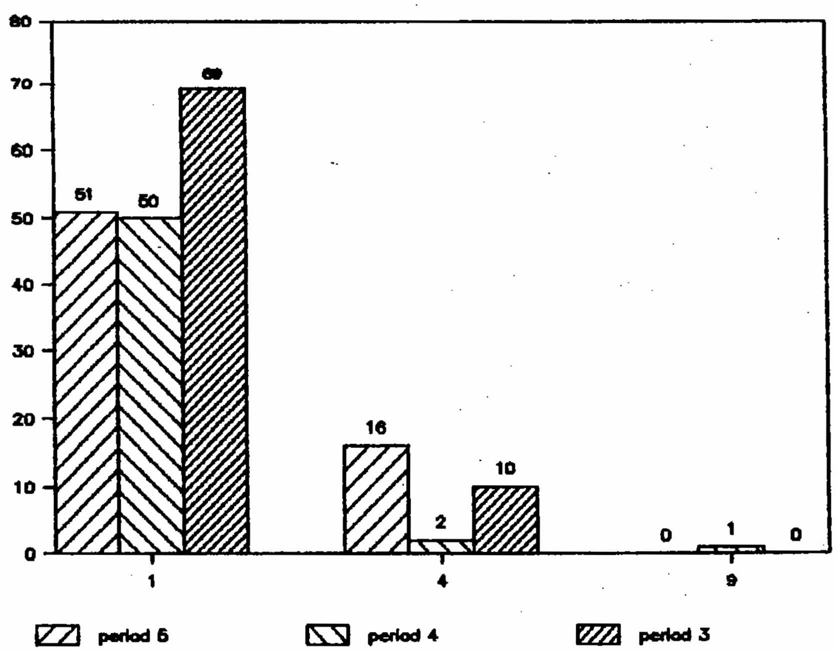
- Fig. 3: Primary classification. 1= flake, 2= blade, 3= core, 4= waste, 9= unsure, 14= crested blade, 15= decortification flake, 16= pebble.



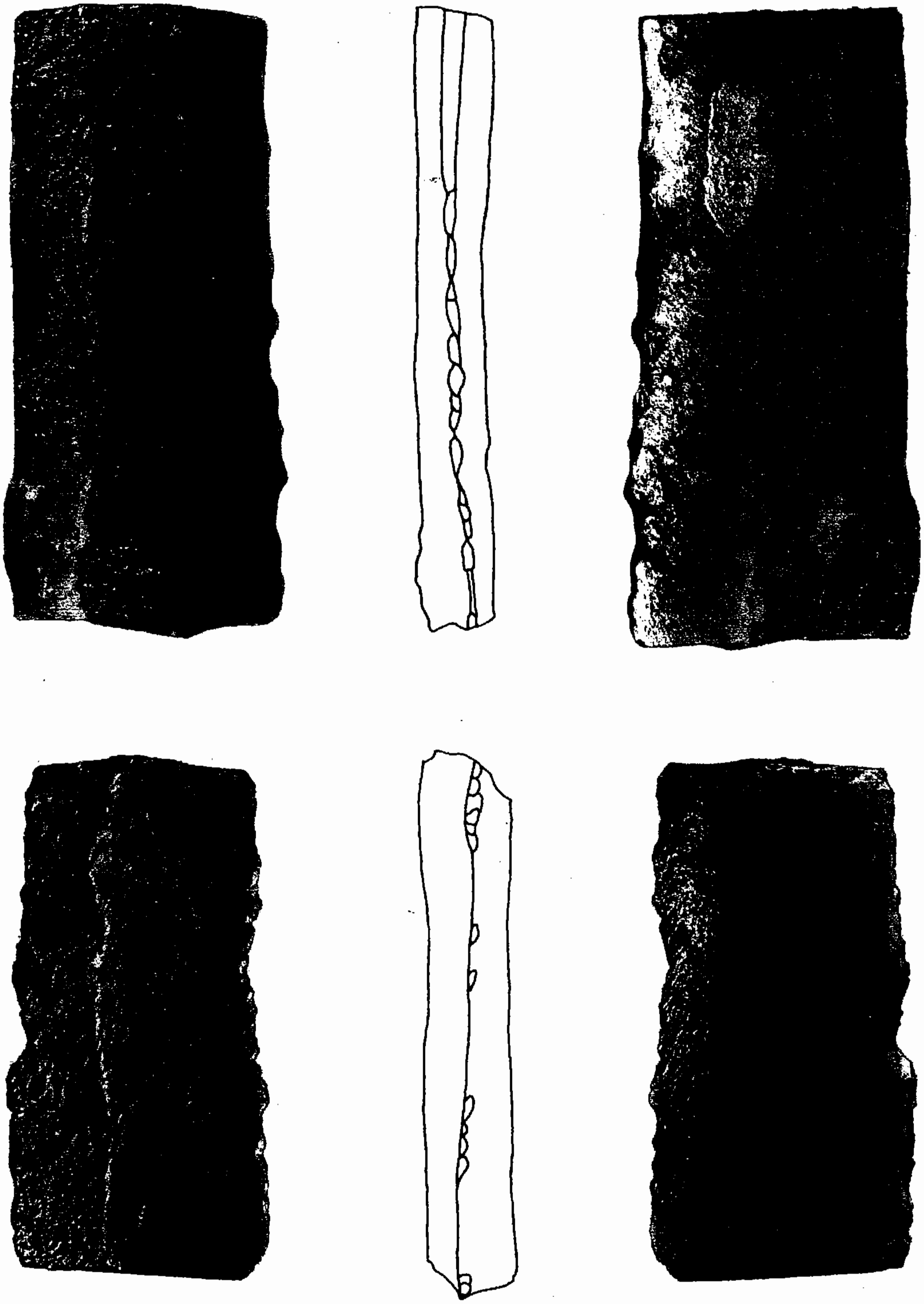
- Fig. 4: Degree of burning. 1= unburned, 2= burned, 9= unsure.



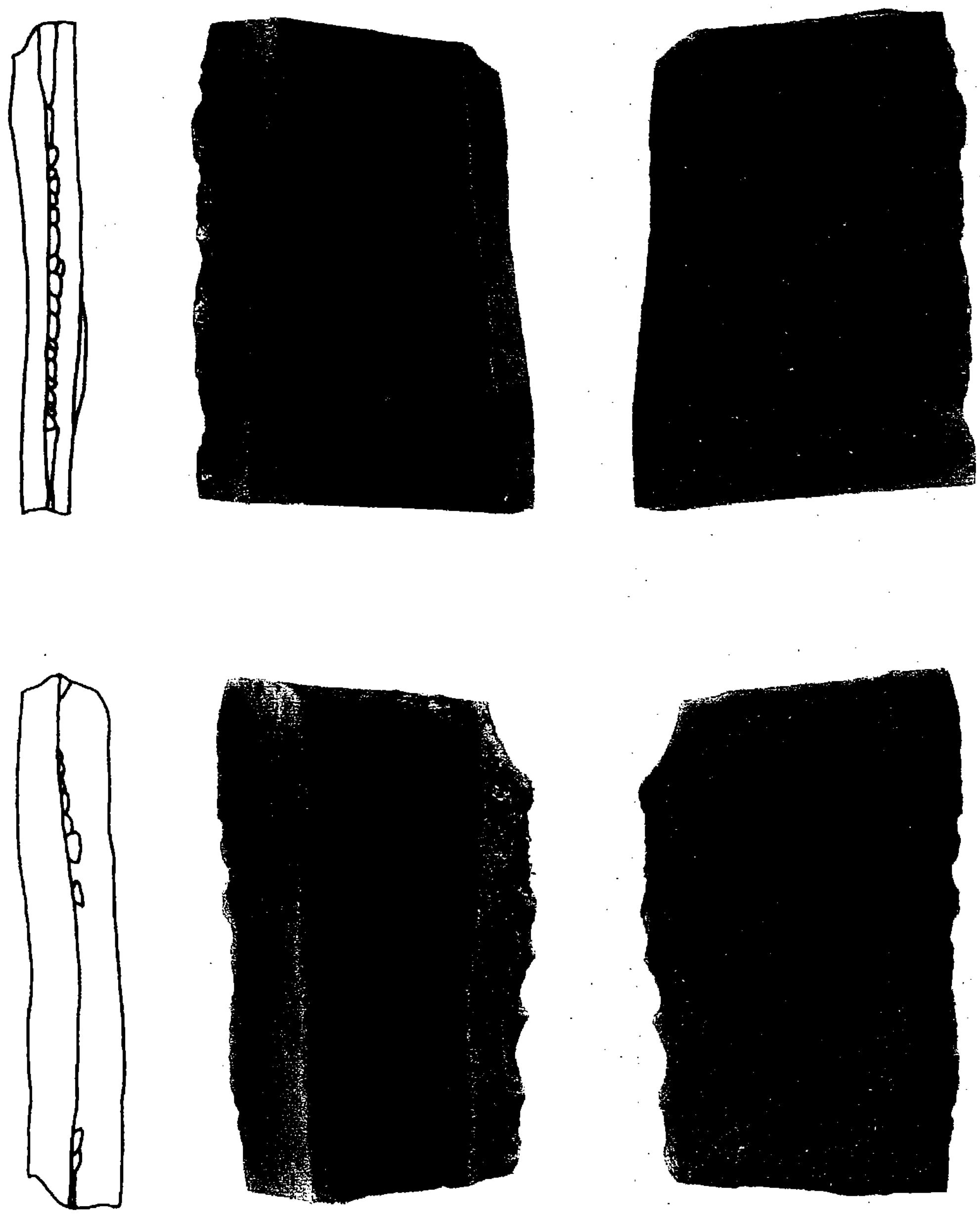
- Fig. 5: Breakage patterns. 1= complete, 2= distal fragment, 3= medial fragment, 4= proximal fragment, 5= broken lengthwise, 6= potlitted, 8= not applicable, 9= unsure.



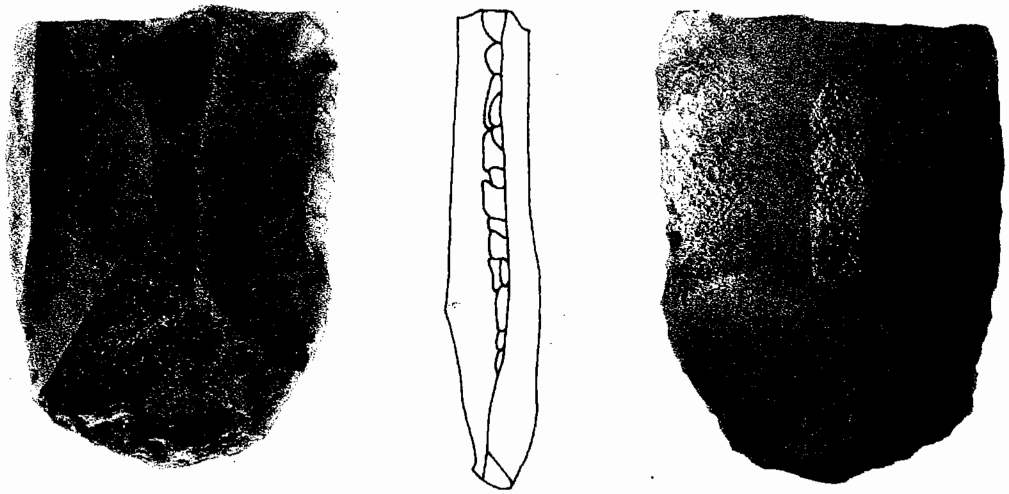
- Fig. 6: Traces of hafting. 1= absent, 4= bitumen or "backing", 9= unsure.



- Fig. 7: Two sickle-blade segments exhibiting gloss and traces of hafting (scale 2:1).
a. sickle-blade segment from stratum 34 (floor deposit; Period III), displaying bitumen.
b. blade segment from stratum 16 with bitumen remains and "backing".

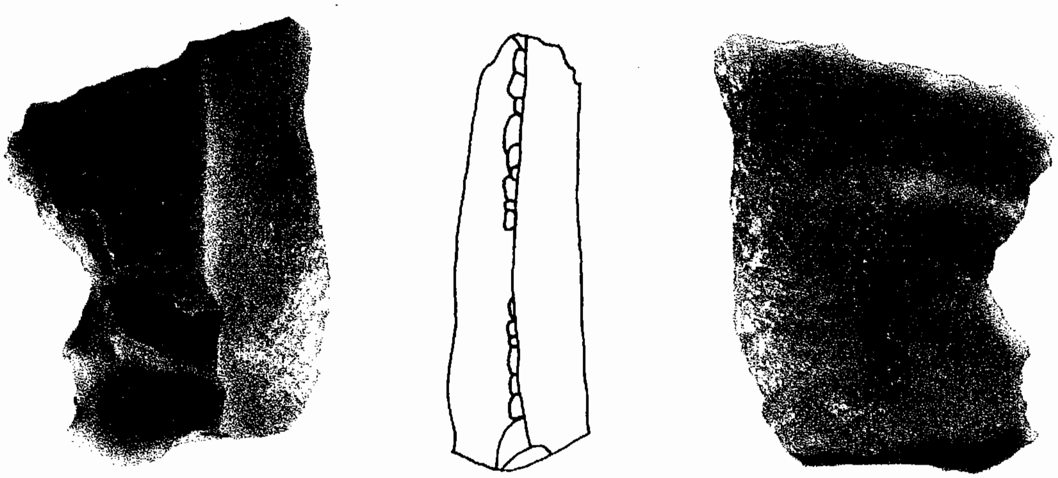


- Fig. 8: Two sickle-blade segments from Period III strata (scale 2:1).
a. implement from stratum 16 with an obtuse angle.
b. specimen from stratum 35 with "backing".



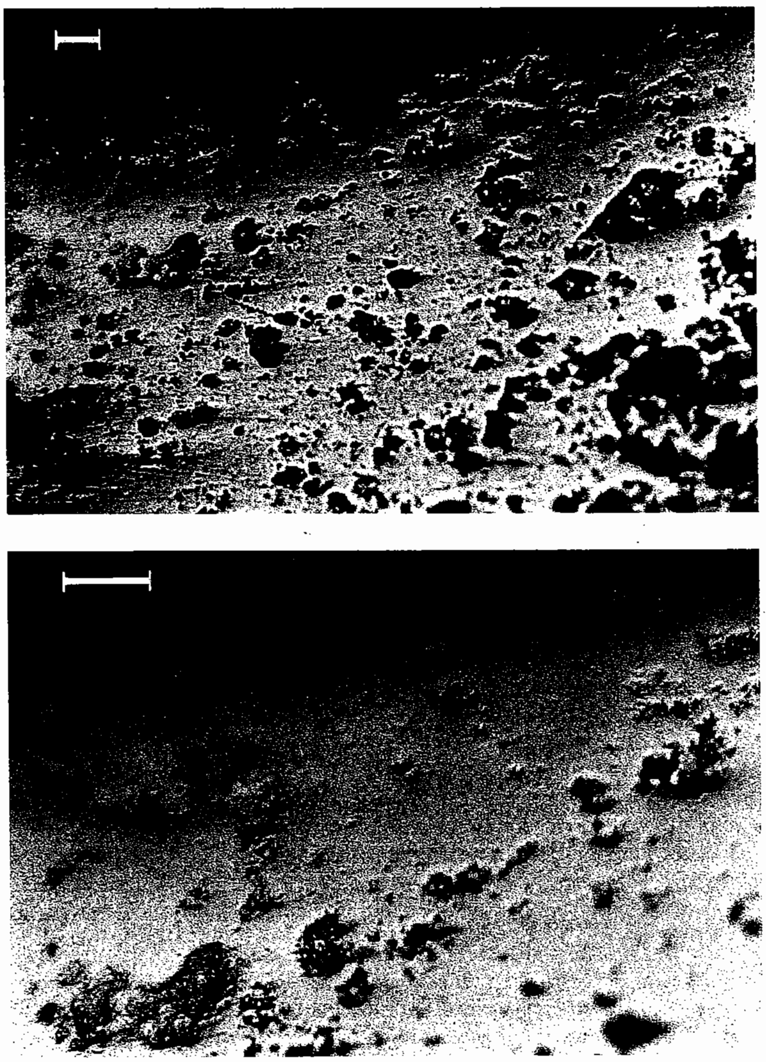
- Fig. 9: Proximal sickle-blade segment from strata 40-41 (scale 2:1).

- Fig. 10: Sickle-blade segment displaying gloss and traces of bitumen on both lateral edges (stratum 28, Period III) (scale 2:1).



- Fig. 11: Sickle-blade segment secondarily retouched into a straight end-scraper (stratum 35) (scale 2:1).

- Fig. 12: Rough, striated sickle-gloss on a sickle-blade segment from stratum 48 floor (original magnification 100x).



- Fig. 13: Smooth variety of sickle-gloss on a sickle-blade segment from strata 40-41. a. original magnification 100x. b. original magnification 200x.

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Addendum

At the time this article was written, in 1988, use wear analysis was a relatively new method which was clearly still in its "formative period" (Van Gijn 1990). It was believed that with more detailed experiments we should eventually be able to differentiate the wear from a very wide variety of contact materials. This has not proven true, and it turns out that reaping cereals in the Near East produces wear traces which are indistinguishable from those produced in Northwest European context. Also, during that same time, a lot of people were very sceptical about the method entirely (see references in the article). Since that time, a lot of research has been done and we now are much more aware not only of the limitations, but also of the possibilities of the method. One avenue of approach which has proven to be especially helpful is the research of ethnographic tools.

In the above text I express doubts about the character of the sickle sheen on the blade fragments. The polish is much rougher and more striated than on the experimental tools and displays craters, a feature not obtained by regular harvesting experiments. At the time the article was written, it was believed that maybe these features could be due to the presence of large amounts of weeds among the cereals harvested. However, more recent ethnographic observations of the use of traditional agricultural tools have shown that a different explanation should be given. In many areas across the Mediterranean and in the Near East, threshing sledges were observed which were fitted with flint inserts (ethnographic observations by Anderson 1994; Ataman 1999; Skakun 1994; Yerkes and Kardulias 1994). The wear on these inserts displays the same characteristic features as the archaeological sickle blade segments (Anderson and Inizan 1994).

Re-examination of the sickle blade segments from Tell Leilan showed that indeed most of them should be interpreted as threshing sledge inserts (Anderson, Chabot and Van Gijn in prep). This indicates that these blades were specifically produced for use in a threshing sledge. One problem that results from this inference is that we now have to explain the absence of sickles in many Ninevite V sites. At Tell Leilan a few of the blades also displayed traces of harvesting cereals, suggesting that Canaanean blades were deemed suitable for that purpose as well. Also in the Jebel Aruda assemblage, real harvesting tools are present among the glossed Canaanean blades (observation Van Gijn). However, here too, quite a large number displays wear from use in a threshing sledge as well.

At the time the article was written, a broad scale technological analysis of Canaanean blades had not been done. This has changed with the experimental work of Jacques Pélegrin and the technological analysis of Ninevite V lithic assemblages in Northern Mesopotamia by Jacques Chabot (Chabot 2002). An examination of technological attributes of the Tell Leilan blade segments by Chabot shows that they indeed can be considered Canaanean blades (Anderson, Chabot and Van Gijn in prep).

To conclude, this article should be read within the context of the knowledge we had at our disposal in the late eighties. At that time a discrepancy was noted between the wear on the experimental and archaeological sickle blades. It is exactly such discrepancies which lead to new research. With new data becoming available, the glossed blade fragments now can be interpreted as threshing sledge inserts. The next step is to understand harvesting techniques in the past, because harvesting tools in the form of flint sickles seem to be virtually absent now in Ninevite V flint assemblages.

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