Archaeologia Polona, vol. 33:1995, 59–69
PL ISSN 0066-5924

Production, selection and "export" of blanks in the Final Palaeolithic Masovian complex. A case study of the blade workshops from Rydno IV/57 in Southern Poland

Jan Fiedorczuk[a]

In this paper attention is drawn to some aspects of the flint economy of the Final Palaeolithic Masovian complex, mainly on the basis of stone materials from the Rydno IV/57 site. From the results of refitting analysis, a model of flint processing with two types of exploitation is proposed: occasional, and highly advanced, specified in time and space. It was stated that blades intended for "export" are linked with the second type, and were obtained at separate areas described as blade workshops. The extent of that "export" was relatively low, only *ca.* 28 of specimens obtained at blade workshops were transported out of the site. Finally, the purpose of production of blanks, and the problem of exchange in communities of the Masovian complex are considered.

KEY-WORDS: Masovian complex, chocolate flint, blade workshops, selection and "export" of blanks, exchange.

INTRODUCTION

One of the more puzzling aspects of the Masovian flint economy is that related to the production and utilization of blades. The Masovian technology was based on a specially prepared blade core with one surface simultaneously exploited from two opposed platforms. In classic Masovian assemblages, especially those with a flint economy based on chocolate mined raw material, other cores (single platform- or specimens for flakes) were extremely rare (Schild 1980:60). The main goal of flint processing at workshops was the production of blades, which were partly taken away from the site. This "export" is considered as a sign of supplying the Masovian communities with flint for its own future usage or for exchange (Krukowski 1961:191–2; Ginter 1974:66–7) and reflects the advanced conserving strategies of the flint economy (Schild 1984:246). Considering workshops, or habitation sites with

[a] Instytut Archeologii i Etnologii, Polska Akademia Nauk, Warszawa, Poland

workshop elements, it is an enigmatic fact that tools, especially the common ones like burins or end-scrapers, were generally produced from untypical "worse" blades, and even flakes from core preparation, while hundreds of blades were manufactured at that time (Ginter 1974:66; Schild 1980:60; Fiedorczuk 1992:51; Szymczak 1992:112). What is more, a great number of blades were left on the spot, and the proportion of them could exceed 40–50% of all artifacts on the site (Ginter 1974:69; Schild 1984:247; Szymczak 1992:111). This phenomenon is linked with a "wasteful" raw material economy (Sulgostowska 1989:88) or interpreted as the result of usage of blades or their fragments as unworked pieces (Chmielewska 1978:73; Sulgostowska 1989:83). An interesting hypothesis on this subject has recently been presented by Szymczak (1992:113), who suggested that the blade production and tool manufacture formed two absolutely different production lines, and that the obtained blades were not intended to fabricate tools, at least not specimens acknowledged to be typical for the Masovian complex, but instead were produced with another, still undetermined intention.

The purpose of this report is to present some conclusions relating to the considered topic, which have been formulated on the basis of materials from the Rydno IV/57 site.

SOME REMARKS ON THE RYDNO IV/57 ASSEMBLAGE

Materials from this site for various reasons are very attractive for analysis. The main ones are as follows:

1. This settlement unit was situated within the large complex of sites surrounding the Final Palaeolithic haematite mine, and near sources of excellent chocolate raw material, on which the flint economy of these units was based. It has been suggested that the described area must have formed a very special prehistoric centre, fulfilling important economic and social functions of the Masovian band societies (Schild and Królik 1981:80).

2. Among the Masovian sites, it was one of the richest in retouched tools, which is quite puzzling in the light of the fact that workshop elements were clearly visible there.

3. Finally, the refitting analysis applied here was very successful and has provided a lot of information on technology, flint economy and behaviour of knappers (Fiedorczuk 1992:47–59). In particular, the separation of two different types of core exploitation, occasional and specified in time and space, and the possibility to estimate the extent of production and export of blanks seem to be very promising in studying the discussed "blade" aspect of flint economy. Additionally, it is worth noticing, that particular finds can be related to specific nodules or cores in many cases, which allows research on the differentiation of personal skill of the flint-knappers.

PRODUCTION OF BLADES IN RELATION TO THE TYPE OF EXPLOITATION

The reduction of some cores was carried out many times at various places on the site, which was proved by the wide distribution of exploitation refuse (Fiedorczuk 1992:57). Thus, the exploitation was of an occasional type, and blades were obtained as the necessity arose, with the aim of the fabrication of specific "household" tools (for example, some massive burins and truncations were made of these blanks). This type of core reducing is thus connected with the habitation character of the site.

The exploitation specified in time and space reflects then workshop elements visible in the analysed assemblage. It occurred at separate areas described as blade workshops. The distribution of refitted pieces revealed three such places, but estimations and statistical analyses used in the next sections have been feasible only for two of them (I and II). The extent of artifacts joining in the case of workshop III was insufficient (Fiedorczuk 1992:58). The reduction of pre-cores belonging to this group was a single episode, during which they were utilized as a whole. This fact suggests that blades produced in this way were not intended for expedient, on the spot use, but mainly for future usage. Specimens obtained there were utilized extremely rarely to fabricate the retouched tools on the site, from amongst *ca.* 400 blades manufactured at the two workshops only a dozen pieces were used to this end.

PROBLEM OF CASUAL TOOLS AND PSEUDOTOOLS

Amongst the pieces abandoned at workshops as waste, there occurred a number of retouched specimens. Their presence seems to be an effect of two factors. Some of these forms, the retouch of which undoubtedly is intentional, were most probably made to be used during the flint processing at workshops. They can thus be treated as typical casual tools utilized for specific purposes, as the necessity arose, and then abandoned after usage on the spot. The second group includes specimens with traces, which rather should not be connected with the intentional activity of man, but are probably due to accidental phenomenona and post depositional processes. They can be called pseudotools, after Sobczyk (1993:68–9).

SELECTION OF BLADES AND "EXPORT" OF PRODUCTS

The reconstruction of the original shape of reduced blocks makes it possible to estimate the productivity of cores, and the quantity of blades which were selected and

taken away from workshops, and then from the site. The estimated values presented in Table 1 indicate that the number of selected specimens was relatively low and did

Table 1. Rydno IV/57. Estimation of the production, selection and "export" of blades from workshops I and II.

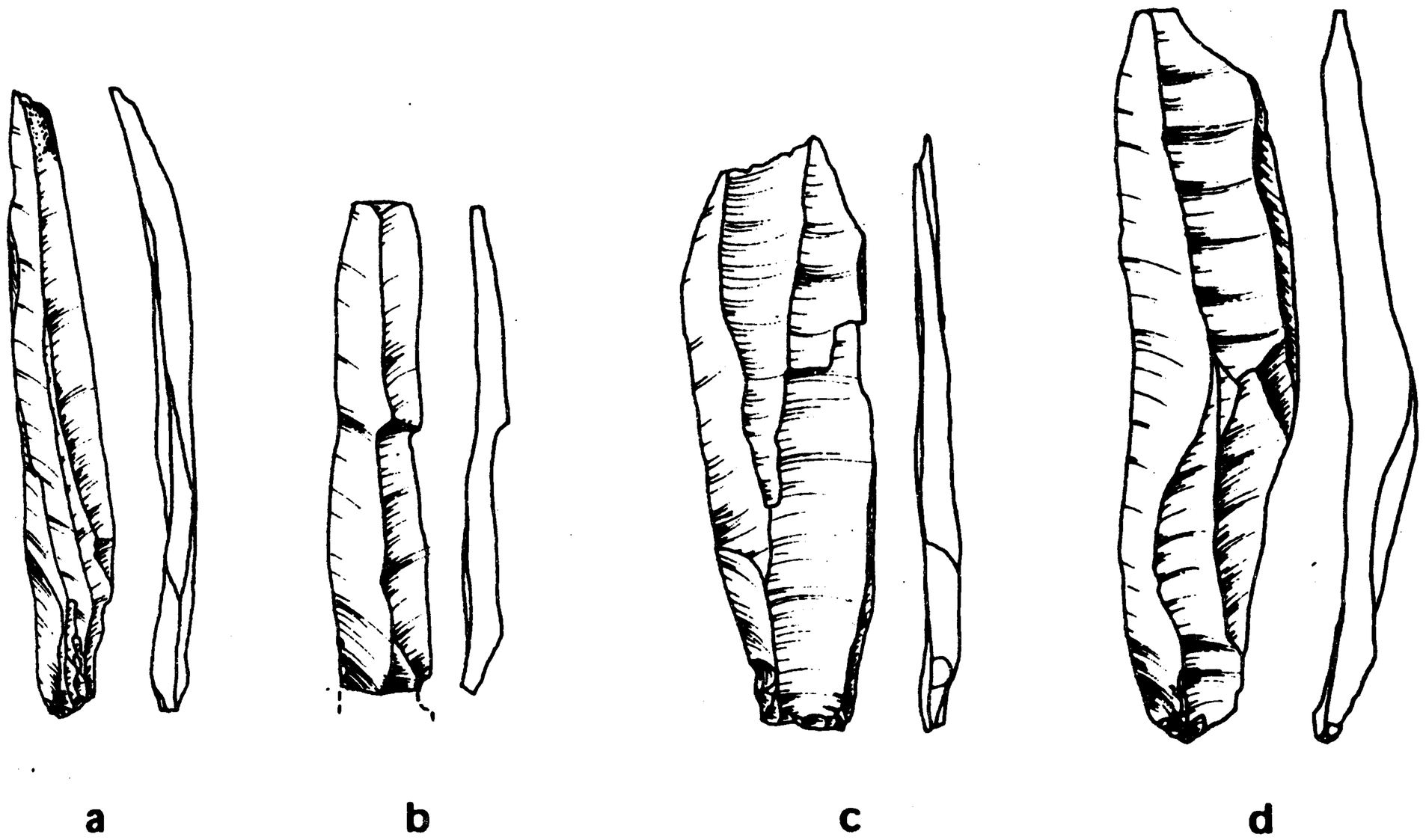
L	manufactured	selected		abandoned as waste?
		left	exported	
I	*ca.* 170	28	*ca.* 40 (23%)	*ca.* 102 (60%)
II	*ca.* 225	12	*ca.* 70 (31%)	*ca.* 143 (64%)
total	*ca.* 395	40	*ca.* 110 (28%)	*ca.* 245 (62%)

not exceed 40% of all manufactured. It should be noticed that estimations for both workshops are quite close. However, the quantity of blanks transported out of the site was still lower, and amounted to 31% for workshop II and 23% for workshop I. The distinction is implied by the fact that only 15% from workshop II, but up to 43% of all selected blades from workshop I were left on the spot. It seems to testify to the dissimilarity of the purposes for which blades were produced, and consequently reflects some kind of functional differences. It could be also due to the differentiation of the personal skill of the flint-knappers. The particular character of flint processing of both workshops as well as the statistically significant difference in the length of blades confirm that possibility (Fiedorczuk 1992:47–8, 58).

MORPHOLOGICAL ANALYSIS OF BLANKS

Besides the described estimations, we can try to determine some morphological, at least metric, preferences of the selection of blanks intended for "export". Such a possibility arises because a part of the selected blades and tools made of them was abandoned on the site (Figs 1–2). Assuming that they compose a sample representative for the whole population of selected specimens, we can compare them with pieces treated as waste. Statistical analysis of blades from workshops I and II has been applied to establish significant differences in their metric features, *i.e.*, their length, width and thickness. Useful for this purpose is the Student's t-test (Schild, Królik and Marczak 1985:79), which enabled us to determine the presence or absence of the significant dissimilarity in mean values. χ^2 and Kolmogorov-Smirnov tests have been used to measure the significance of the difference in general structure of the dorsal surface types of two groups of blanks.

As can be seen in Table 2, differences in the length and thickness between the two groups of blades are statistically significant, whereas the dissimilarity in the width is



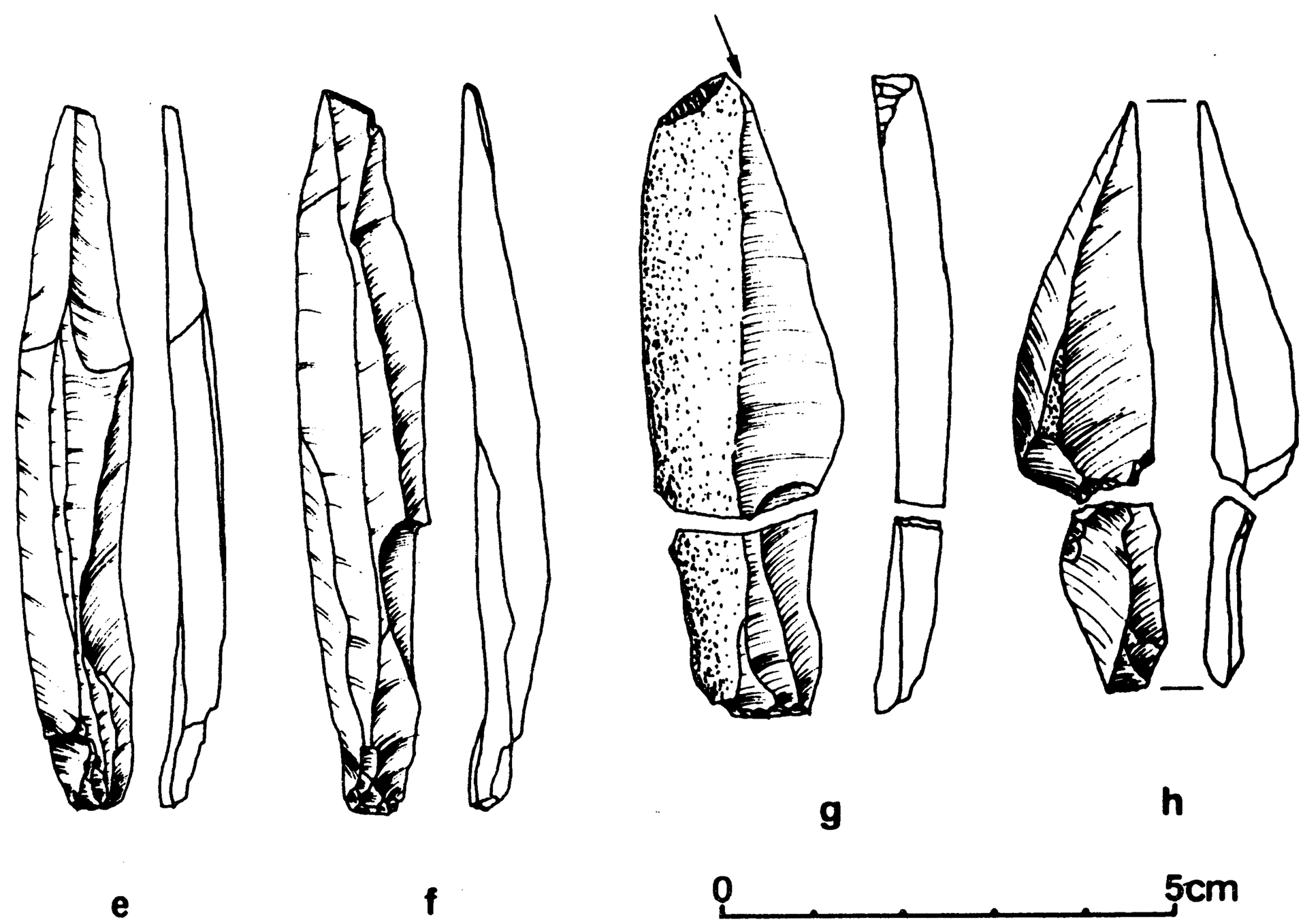


Fig. 1. Rydno IV/57. Selected blades and burin (g), obtained at the blade workshop I from the core No. 2.

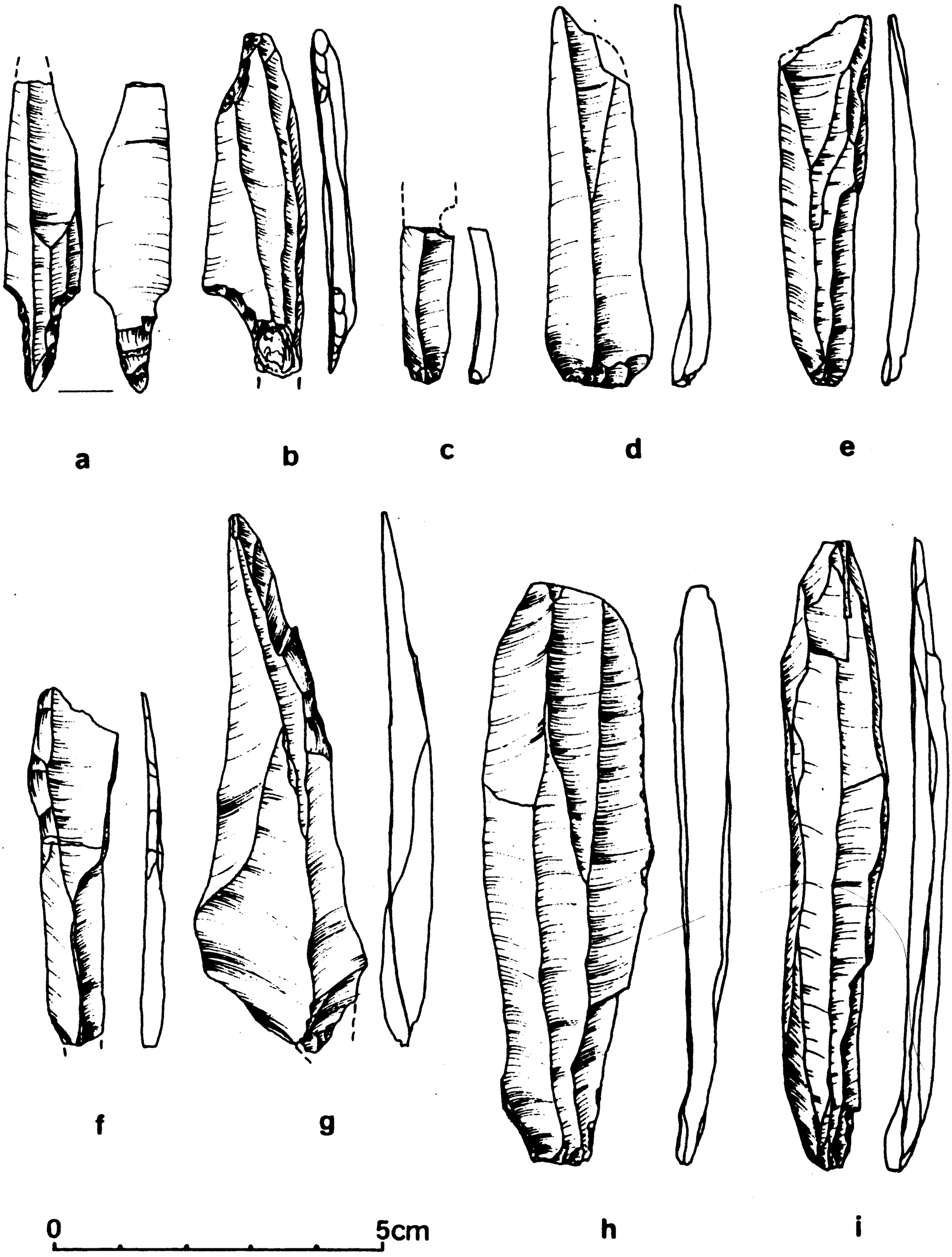


Fig. 2. Rydno IV/57. Selected blades and tools (a–b not refitted in block, but most probably made of blanks from the same core), obtained at the workshop II from the core No. 4.

Table 2. Rydno IV/57. Matrix showing the significance of differences in main metric features between blades abandoned as waste and selected blades. **T-test:** L — length; W — width; T — thickness; L/W — ratio of length to width; **KS test:** S — structure of types of dorsal surface. Numbers indicate the level (α), on which the difference is statistically significant.

L	W	L/W	T	S
0.000	0.740	0.004	0.001	0.930

not. Especially, the result of the t-test is suggestive in the case of length, as the difference is significant on the level of $\alpha < 0.001$. Resulting from this, a preference for the longer blades during selection is visible very clearly also by comparing bar graphs showing the distribution of the length of abandoned and selected pieces (Fig. 3). In the first case, classes from 30 to 70 mm contain almost equal, considerable numbers of

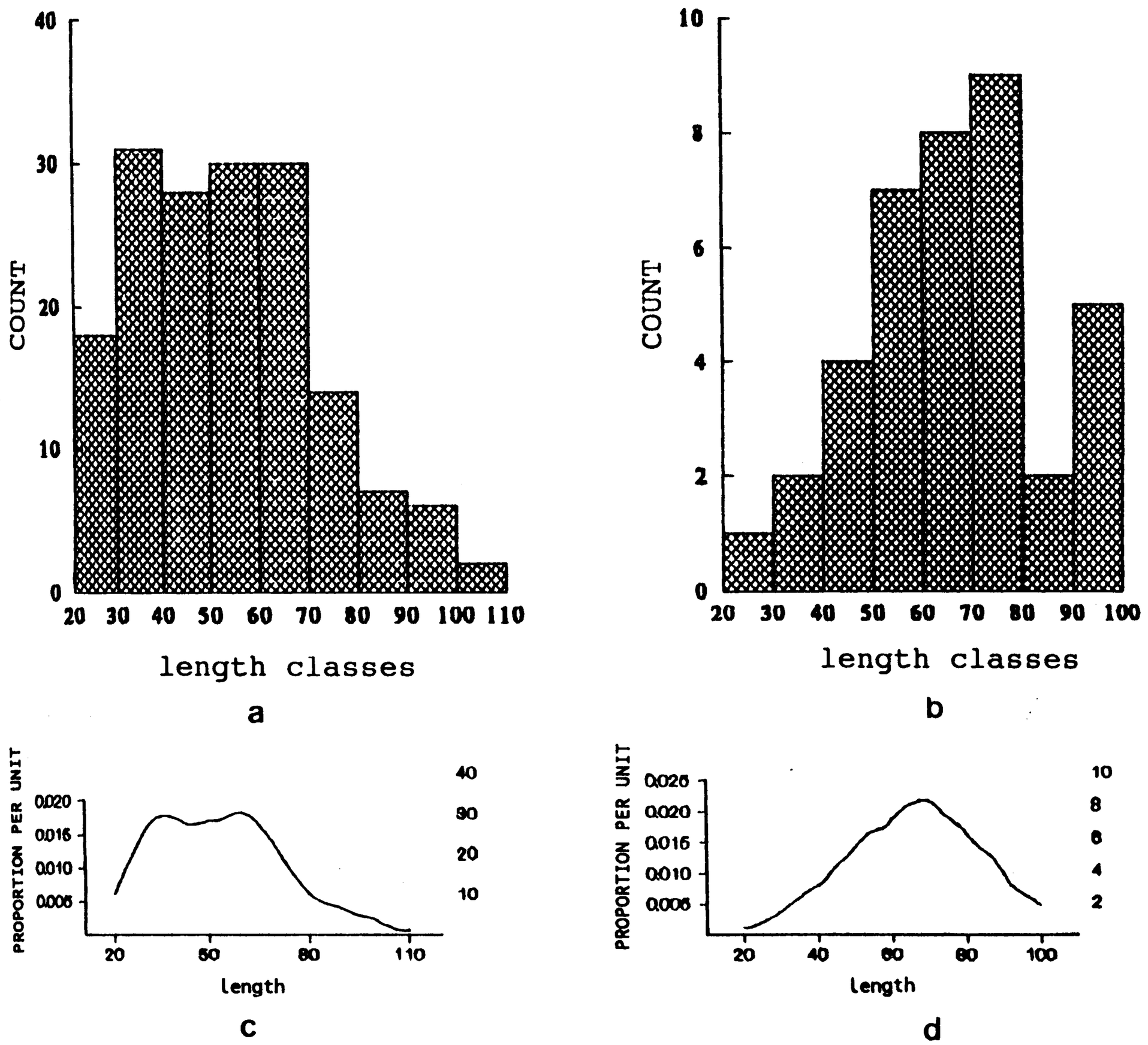


Fig. 3. Rydno IV/57. Bar graphs (a–b), and density plots (c–d) showing the distribution of length of blades: a,c — abandoned as waste, b,d — selected.

specimens, while in the second, the dominant class is 70–80 mm. What is more, the rank of 90–100 mm contains a relatively high proportion of selected blades. It is a similar situation with thickness, where the thick blanks were preferable to thin ones. It should be noticed that criteria of selection are, to some degree, individual for each core. In the case of block No. 2 all selected blades are over 6 cm long, while blanks obtained from block No. 4 do not constitute such a closed group (Fig. 4).

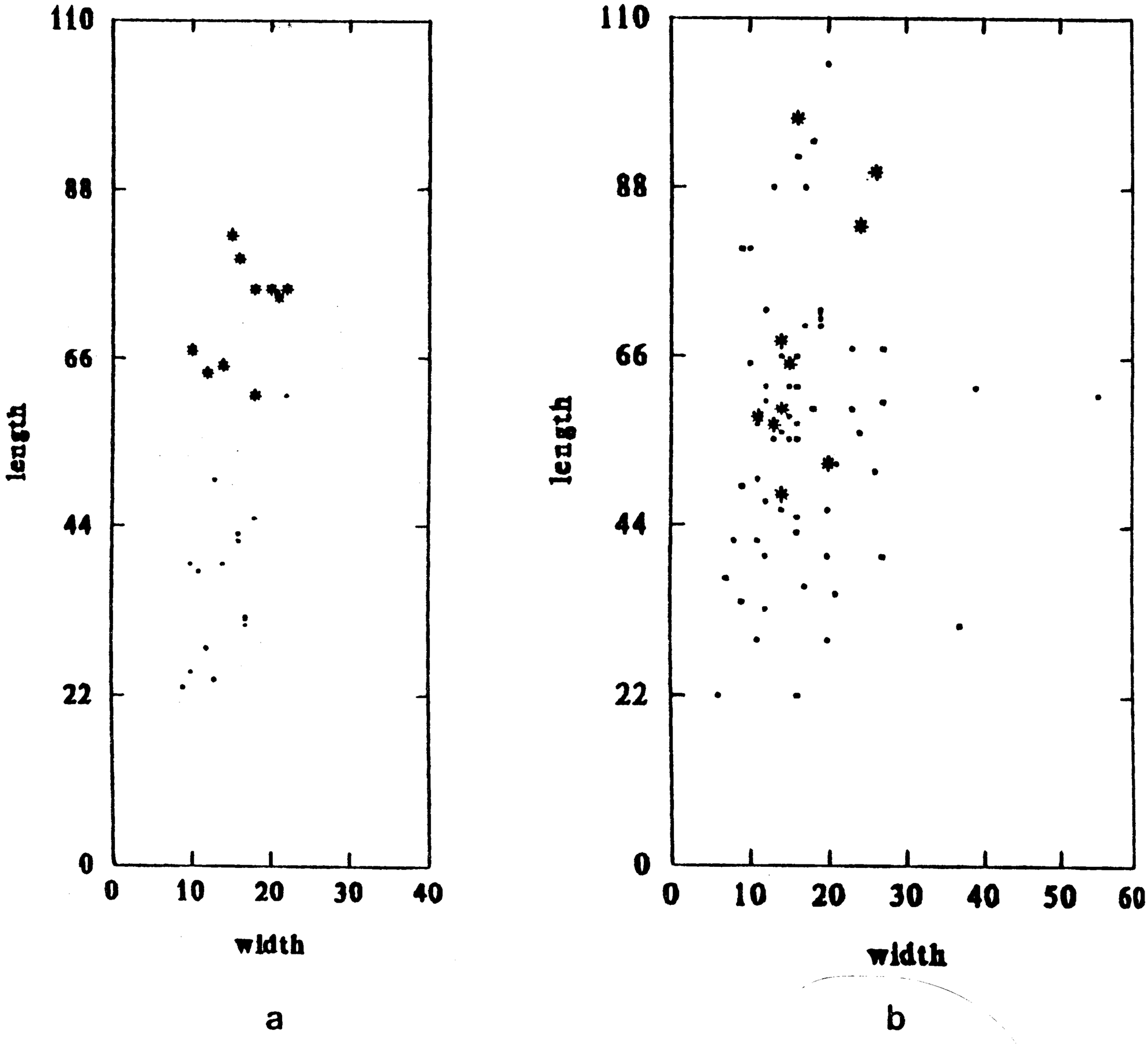


Fig. 4. Rydno IV/57. Length-width ratio of specimens obtained from exploitation of core No. 2 (a), and core No. 4 (b). Blades abandoned at workshops are marked as dots, while blanks which were selected and taken away from workshops as asterisks.

According to the χ^2 and Kolmogorov-Smirnov tests, the difference in distribution of specimens with cortex or with traces of flaking surface preparation and rejuvenation of the two groups of blades is not significant. It seems therefore that the type of surface was not of direct importance during selection.

THE GOAL OF BLANK PRODUCTION: EXCHANGE OR OWN REQUIREMENTS

Two different opinions on this subject have been formulated in the literature. The first, presented by Taute (1968:271), definitely excludes the possibility of the existence of specialized workshops directed towards the manufacture of flint products, with the intention of trading. According to another idea, organized exchange is admitted to a greater or lesser degree (Ginter 1974:66–7; Schild 1976:169). Quite opposite to Taute's opinion was that represented by Krukowski (1922:41, 1961:190), who suggested the existence of a very highly advanced system of exchange of raw material within Masovian communities, organized by groups engaged in that activity only.

Three essential observations require an explanation in this context: the very wide distribution of the chocolate flint among the Final Palaeolithic communities, the existence of workshops producing blanks with the intention of transporting them away, and the presence of individual finds of exotic raw materials such as obsidian or jasper on some sites.

To explain these facts, the specific model of the life and economy of Masovian band societies can be very helpful. This is characterized by the large amplitude of seasonal nomadism associated with the migration of the reindeer (Schild 1976:173). The distribution of the chocolate flint, described by a so-called fall-off effect (Schild 1976:165) is most probably due to this mobility. If so, this fact can be explained as the supplying of Masovian groups with raw material for their own future usage, without the necessity to apply a model of advanced, highly specialized exchange. For example, if even the Rydno IV/57 assemblage is treated as one chronological unit, the maximum number of "exported" blanks and tools could not exceed 150 pieces. Assuming the long stay of this group far away from the source of high quality flint, the production of blades mainly for their own future usage can easily be accepted. Of course, exchange had to be present in the life of the late Palaeolithic communities, this is confirmed by many pieces of evidence, for example by individual "imports" of chocolate flint over distances of 300–400 km, even over 700 km from the sources (Sulgostowska 1990:320), or finds of obsidian and radiolarite-jasper (?) uncovered on the Masovian sites, 500–650 km from their source area (Schild 1975:330; Sulgostowska 1989:35).

As is well known, exchange in primitive societies often takes a general form that has been called reciprocity (Sahlins 1965:39–236). This phenomenon, having some variations, is never purely utilitarian, but simultaneously social (Service 1966:19–20).

It seems that the utilitarian aspect of exchange in Palaeolithic societies should not be overestimated. It does not resemble the phenomena of utilitarian trade known

from later times. Advanced economic specialisation is very problematical. The social aspect of exchange had to be very important, perhaps much more than the utilitarian one.

CONCLUSIONS

1. The production of blades at separate areas described as blades workshops was undoubtedly intended for future usage. Blanks obtained there only sporadically were used to manufacture tools on the site. An estimation indicates that the extent of blanks selected to be taken away was relatively low. Only *ca.* 110 specimens (28%) obtained from 5 cores at two workshops were transported out of the site. The possible number of all "exported" blades, including these selected at workshop III, could not exceed 150.

2. Very clear is the preference for some values of metric features. Selected blades were longer and thicker than average pieces. The difference between workshops, in proportions of selected blades left on the site, suggests the dissimilarity of purpose for which they were manufactured, or reflects the distinction of personal skill of flint-knappers.

3. The main goal of blank production and selection was the supplying of the group with raw material for its own future requirements linked most probably with a specific style of life — nomadism with large amplitude of seasonal migrations. The distribution of individual imports of chocolate flint over great distances (200–400 km and more) from the source area should be linked with some kind of exchange, although it is doubtful if this was advanced utilitarian exchange organized by communities engaged only, or mainly, in such activity.

REFERENCES

Chmielewska, M. 1978. *Późny paleolit pradoliny warszawsko-berlińskiej*. Wrocław.

Fiedorczuk, J. 1992. Późnopaleolityczne zespoły krzemienne ze stanowiska Rydno IV 57 w świetle metody składanek. *Przegląd Archeologiczny* 39:13–65.

Ginter, B. 1974. Wydobywanie, przetwórstwo i dystrybucja surowców i wyrobów krzemiennych w schyłkowym paleolicie północnej części Europy środkowej. *Przegląd Archeologiczny* 22:5–122.

Krukowski, S. 1922. Pierwociny krzemieniarskie górnictwa, transportu i handlu w holocenie Polski. Część II. *Wiadomości Archeologiczne* 7:34–57.

– 1961. Rydno. *Przegląd Geologiczny* 9(4):190–2.

Sahlins, M.D. 1965. On the sociology of primitive exchange. In *The relevance of models for social anthropology*, M. Banton (ed.), 1:39–236. London.

Schild, R. 1975. Późny paleolit. In *Prahistoria ziem polskich, Vol. 1. Paleolit i mezolit*, W. Chmielewski and W. Hensel (eds), 150–338. Wrocław.

- 1976. Flint mining and trade in Polish prehistory as seen from the perspective of the chocolate flint of central Poland. A second approach. *Acta Archaeologica Carpathica* 16:147–77.
- 1980. Introduction to dynamic technological analysis of chipped stone assemblages. In *Unconventional archaeology*, R. Schild (ed.), 57–85. Wrocław.
- 1984. Terminal Paleolithic of the North European Plain: a review of lost chances, potential, and hopes. In *Advances in world archaeology*, F. Wendorf and A.E. Close (eds), 3:193–274.

Schild, R. and H. Królik 1981. Rydno. A Final Paleolithic ochre mining complex. *Przegląd Archeologiczny* 29:53–100.

Schild, R., H. Królik and M. Marczak 1985. *Kopalnia krzemienia czekoladowego w Tomaszowie*. Wrocław.

Service, E.R. 1966. *The hunters*. Englewood Cliffs.

Sobczyk, K. 1993. *The Late Palaeolithic flint workshops at Brzoskwinia-Krzemionki near Kraków*. Kraków.

Sulgostowska, Z. 1989. *Prahistoria międzyrzecza Wisły, Niemna i Dniestru u schyłku plejstocenu*. Warszawa.

- 1990. Occurence and utilization of local ochre resources during the Early Holocene in the Oder and Vistula River Basins. In *Contributions to the Mesolithic in Europe*, P.M. Vermeersch and P. Van Peer (eds), 317–21. Leuven.

Szymczak, K. 1992. *Północno-wschodnia prowincja surowcowa kultury świderskiej*. Łódź.

Taute, W. 1968. *Die Stielspitzen-Gruppen in nördlichen Mitteleuropa*. Köln.