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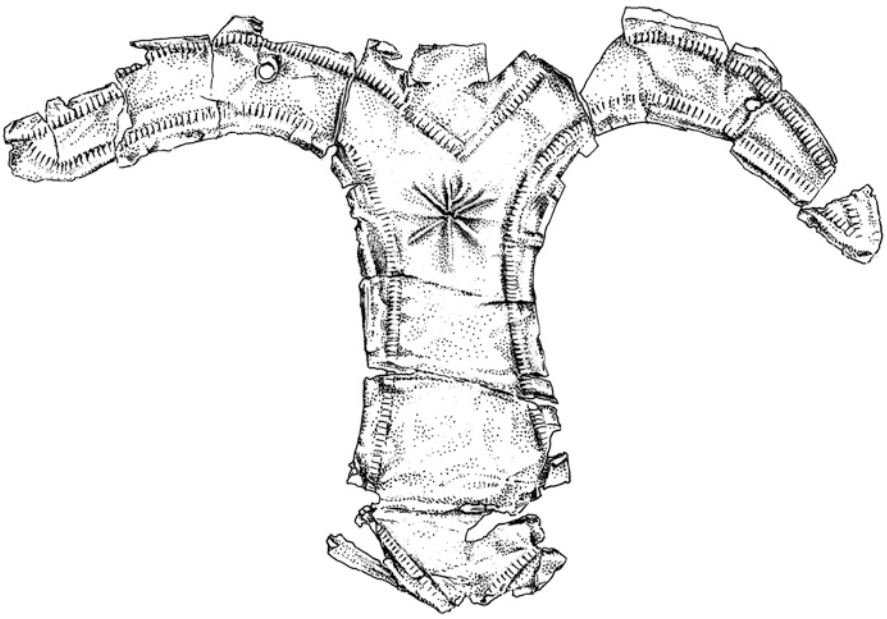

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The war as seen by an archaeologist. Reconstruction of barbarian weapons and fighting techniques in the Roman Period based on the analysis of graves containing weapons.

The case of the Przeworsk Culture

Bartosz Kontny

The methods of combat used in the Roman Period have been discussed by many authors, who based their work mainly on the information from written sources and ancient iconography[1], and used the archaeological sources only to illustrate their views. There is no point in repeating what has already been discovered in this respect, new monographs do not bring any substantial changes to the picture. However, it should be noted that the archaeological sources from certain cultural domains provide the possibility to reproduce some methods of combat and their changes. Particularly promising material is provided by Przeworsk Culture graves, frequently of precise chronology, which often contain sets of weapons.

From the very start it should be made clear that the analysis of combinations of weapon sets found in burial features has some limitations and they can be used to reconstruct the weapon sets used in actual combat only tentatively. It is tempting to assume that weapons put in the grave together with the deceased made up his actual combat gear. However, there existed many factors which might have distorted the true image. To quote H. J. Eggers'[2] these are the processes leading to the replacement of the living culture **(die lebende Kultur)** by the dead culture **(die tote Kultur)**, which becomes the rediscovered culture **(die wiederentdeckte Kultur)** owing to excavations or accidental discoveries. This is accompanied by the information drift (decrease in the amount of information) which may be explained by the entropy or destruction of the archaeological material but also by using improper excavation or conservation methods[3], as well as other reasons. For the discussed period the last mentioned ones may mean, e.g., putting only selected objects in the grave or involving some magical-religious behaviour characteristic for the burial rites some of which are extremely problematic or even impossible to be detected or interpreted today. One should mention apotropaic activities - protecting the dead and protecting from the dead, which may be reflected in equipping them with sharply ending objects such as shafted weapon heads, knives, scissors etc.[4]. Using the *pars pro toto* principle is also of great importance. This, as it seems, concerned mainly the shields, the symbolic meaning of which was very popular among the Ancient civilisations and, as is indicated by the graves equipped in weapons, probably in the *Barbaricum*. Frequently noticed ritual destruction of weapons carried out probably after burning on a funeral pyre before placing them in grave pits is also connected with the magical-religious sphere.

An important part might have been played also by economic issues, e.g., as a result of a shortage of valuable swords in a given population, they were not always put into the graves. Perhaps in this case the sword was handed over to the successors of the deceased. It seems, however, that if that phenomenon became widespread, far fewer swords would be recovered archaeologically. Moreover obvious chronological inconsistencies should be traceble, resulting from the longer use of swords (old-fashioned swords put in graves after decades of use together with modern items). Actually such cases are unique. The military equipment might reflect also the proprietary relations: the deceased warrior did not have to possess all the weapons he used but could have been temporarily provided with them, e.g., by the leader (in the case of retinue members); as a result the weapons which were not his private property would not be put in his grave.

Another factor which, while limiting information about the **lebende Kultur**, in a significant way modified the mod-

ern knowledge about the military equipment, was the custom of cremation. The corpses were cremated on a funeral pyre together with their equipment because of ideological and religious premises. For that reason the objects made from organic materials could not be preserved (only occasionally remains of the shafts can be found in the sockets of spear- or arrowheads). This custom might have distorted the modern perception of the Przeworsk Culture military equipment the more so that there are reasons to believe that some of the elements (e.g., shields, spears, maces) might have been made entirely from non-durable materials. Also objects made of glass, copper, silver and gold could have been destroyed as the temperature at the pyre was higher than the temperature at which these raw materials melt. In the case of military equipment this might have resulted in the degradation of e.g., bronze shield fittings (especially of the edges and the surface of the shield), inlays on swords and shafted weapon heads, etc.[5].

It is possible that some elements of the military equipment were not deposited in the burials because they were lost when the remains of the pyre were transferred to the grave. This pertains especially to small elements of military equipment such as rivets and nails from shields, fittings from their edges and objects shredded in the process of ritual destruction. It was impossible to destroy completely larger elements such as, e.g., a sword unless it was symbolically replaced by the scabbard. This might have been particularly important starting from the end of phase C_{1b} as the grave goods in that period became poor and much less numerous and the grave pits generally shallower and smaller. As the amount of human bones was smaller in burials than that remaining after an experimental incineration of a human skeleton, it has been suggested that only part of the charred bones and remains of pyre was put into the grave[6]. It also seems probable that the remains of several cremations might have got mixed up on a pyre (as a result bones of several individuals may be registered in one burial). These dangers seem to involve anthropological issues rather than those concerning the 'completeness' of grave goods. Cases of evident 'inconsistencies' in the composition of the grave goods impossible to explain in any other way are quite rare.

Another valid factor diminishing the information gained by archaeological methods might have been grave robberies. The existence of this phenomenon has been confirmed by the numerous traces of plunderers' pits, frequently registered in burials from the Barbaricum of the Roman Period. As they usually concern burials with valuable grave goods, but not necessarily of an outstanding form, it may be assumed that many of the robberies took place in Antiquity, soon after the body was buried when the robbers might have known the value of the grave goods and their precise location[7]. The proof of pillaged burials in the middle Warta river basin (which concerns mostly burials of the Przeworsk Culture), probably by an artisan-moulder is the hoard from Łubiana, Kościerzyna commune. The analysis of the hoard indicates that the robbery probably took place in the Early Migration Period[8]. Traces of the robbery may not be noticed if the excavations are not conducted in a fully professional way.

It should be finally stressed that despite their attempts archaeologists are not able to reproduce the greater part of burial rites. For that reason it is impossible to ensure that some features of the burials and grave goods are not interpreted contrary to their true significance. Ethnographical examples presenting the disproportions between the reasoning generally applied by the archaeologists and the reality known from the ethnographical descriptions have been presented by e.g., P. J. Ucko or F. McHugh[9].

One should underline that we most probably deal with the real weapon, used in everyday life. This is corroborated by the fact that traces of repairs are occasionally spotted on weapons found in graves. They appear mainly on shield bosses (rarely also shield grips, swords, lances and spurs), which may be explained by the fact that they are permanently exposed to the hits of an enemy's weapon. Moreover, the most frequently repaired parts of shield bosses are places where enemy's blows stop and therefore are ultimately effective, e. g. lower part of spikes (Fig. 1)[10]. Also some unusual deformations noticed on shield bosses might be very informative. For example the twisted spike of the umbo type Jahn 7b (loose find) from Nasławice, Sobótka commune, Wrocław district, dolnośląskie voivodehip resulting plausibly from a perpendicular hit to the hard material, like an opponent's shield boss, seems to demonstrate its use as a weapon (Fig. 2).

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In the light of the grave goods from the Przeworsk Culture it should be assumed that the basic offensive weapons put in the graves, and probably also used in life, were shafted weapons[11]. The analysis of the proportion of burials equipped with shafted weapons is presented in Diagram 1, which additionally takes into account the data from the Late Pre-Roman Period. It presents the changes in frequency of burials with shafted weapons[12] in comparison to the number of all weapon graves from a given phase[13]. The results indicate that the proportion of burials with shafted weapons

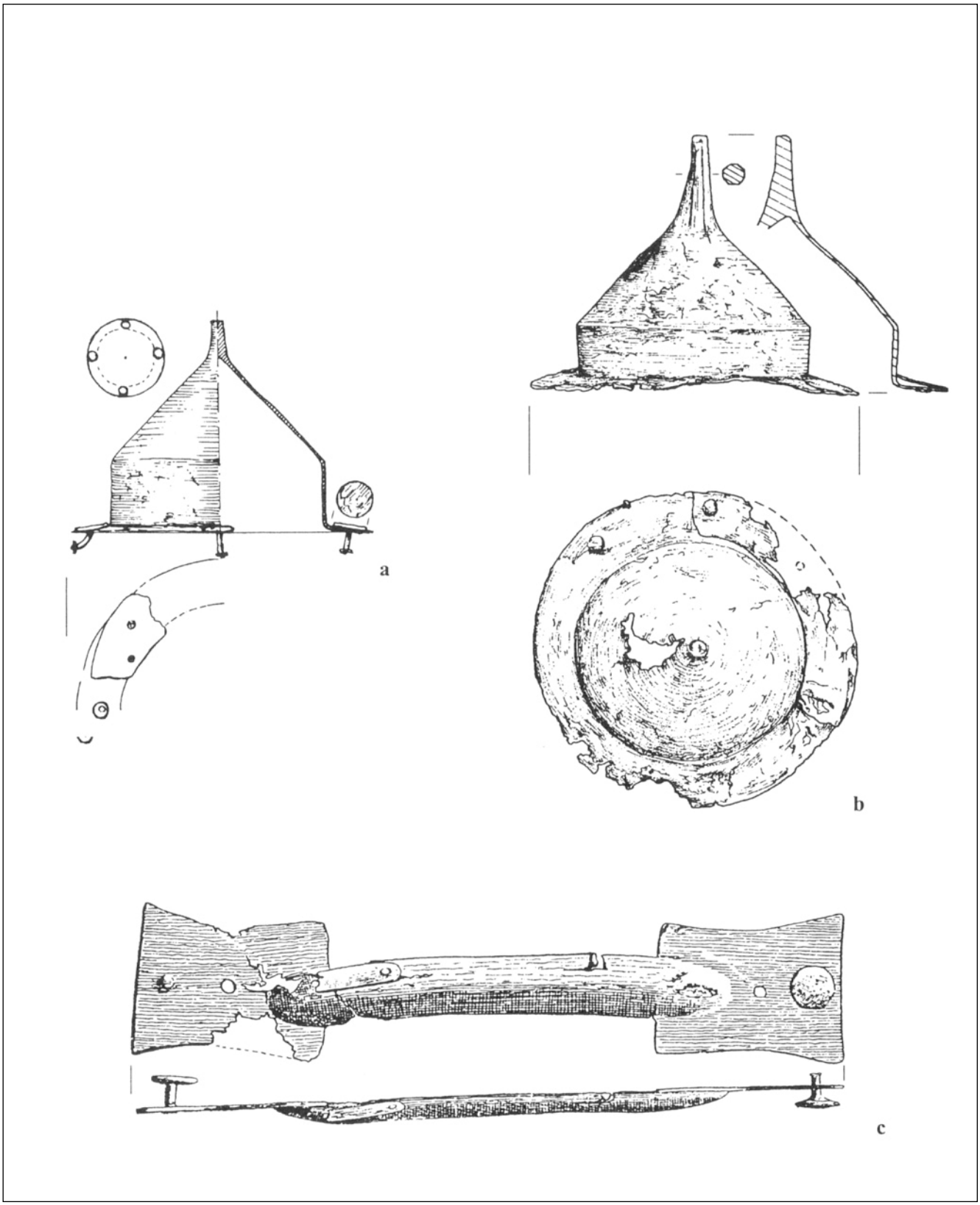

Fig. 1: *Traces of repairs located on shield elements: a - Kamieńczyk, grave 293 (*DĄBROWSKA *1997, pl. 134: 293,1), b - Nadkole, grave 29 (*ANDRZEJOWSKI *1998, pl. 19: 4), c - Młodzikowo, grave 183 (*DYMACZEWSKI *1958: Fig. 319: 12).*

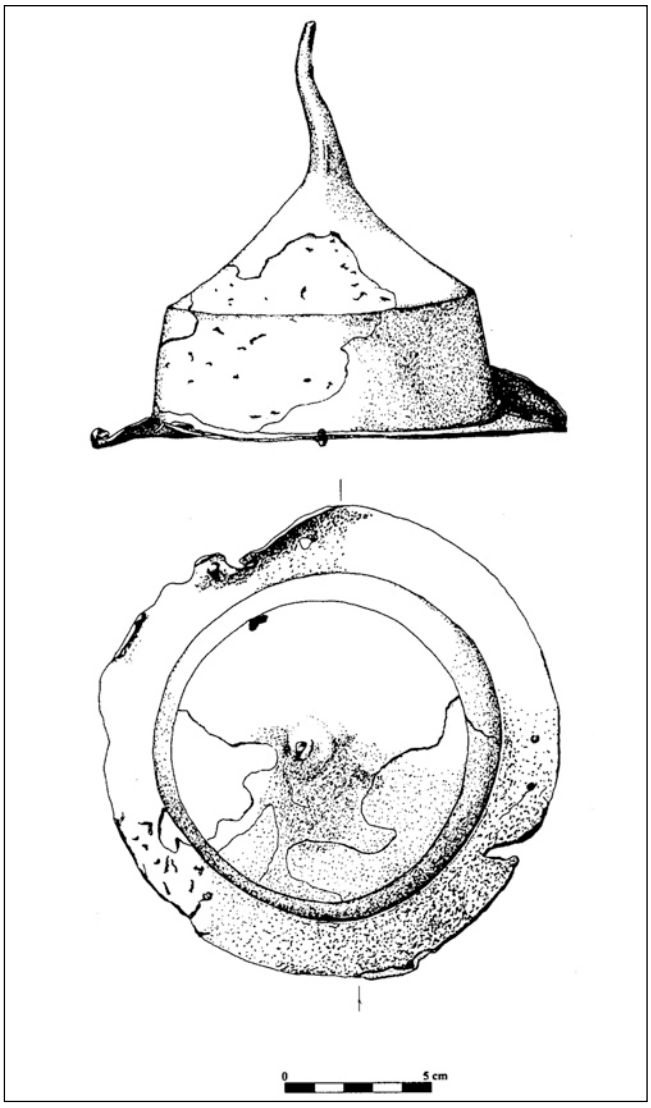

Fig. 2: *Shield boss from Nasławice with traces of deformation (*KONTNY *2001a: Fig 2).*

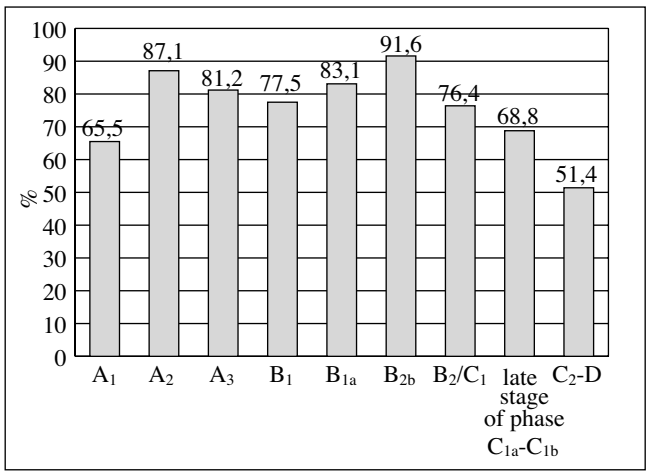

Diagram 1: Frequency of weapon graves furnished with weapon head(s) in the Przeworsk Culture

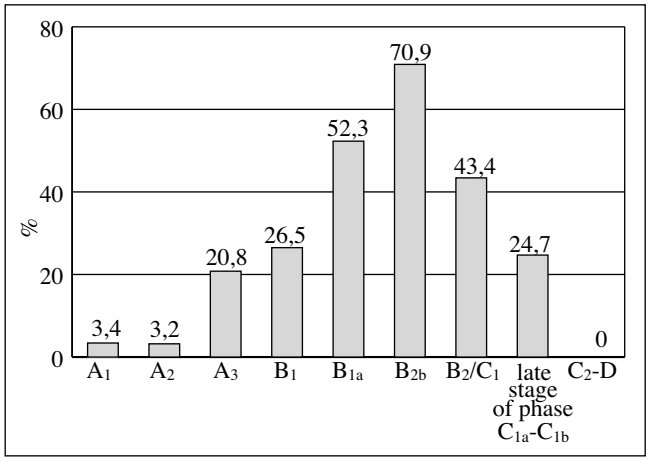

Diagram 2: Frequency of weapon graves furnished with than one shafted weapon head in the Przeworsk Culture

changed in time, yet it never fell below 50%, and sometimes reached (A_2) or even exceeded (B_{2b}) 90%[14].

Diagram 1 does not, however, distinguish between the burials with single shafted weapon heads and those with their greater number. For that reason I decided to study also other aspects of this problem. First I put together the burials with more than a single shafted weapon head (changes of frequency measured in the same way as above) - Diagram 2. It yielded the following picture: burials with several shafted weapon heads can be found as early as in phase A_1, yet their number is very small. The phases which follow manifest a tendency towards increase, reaching a culmination in phase B_{2b} (more than 70 % burials with weapons had several heads). Then there was a gradual decline of importance of this category of grave goods, which completely disappeared in phases C_2-D[15].

The appearance of more than two heads of shafted weapons in burials has been remarked upon in literature and this phenomenon was mainly linked with phase B_{2b}[16]. In this connection it seemed worth while to study the importance of this phenomenon. A histogram (Diagram 3) presenting the numbers of grave assemblages containing several heads was made. Two variants: two shafted weapon heads, and more than two shafted weapon heads were taken into consideration. The diagram indicates that burials with more than two shafted weapon heads were very rare and those with two heads were predominant[17].

It is worth reviewing how the frequency of barbed heads looks against that background (these heads were included in Diagram 2). It is known that they appeared in the Roman Period until phase C_{1a}[18], and were considered to be the most numerous in phases B_1 and B_{2a}[19]. The data (frequen-

cies) presented in Diagram 4 confirm this observation and additionally indicates that the custom of placing barbed heads in burials culminated in phase B_{2a}[20]. Barbed heads are considered unequivocally as javelin heads[21] for the presence of barbs made it impossible to use the weapon more than once: because of the barbs the weapon could not be quickly pulled out of the object in which it was stuck (i.e., the shield or the body of the opponent). This kind of weapon would be a hinderance in hand to hand combat, so it should be considered as a thrown one[22]. The above observation concerning changes in the frequency of barbed heads does not mean, however, that javelins were most often put into burials in phase B_{2a}. The presence of javelins in burial assemblages may be also indicated by other elements, e.g., heads without barbs of different forms (sizes) appearing in one burial.

I tried to obtain additional data concerning the shafted weapon heads' function by studying the differences of length of pairs of heads with leaf shaped blades from one burial. Considerable differences would mean the presence of a lance and a javelin, whereas similar sizes would indicate that weapons of similar form and function were used, suitable both for close combat and fighting from a distance (weapons of dual function)[23]. For that purpose the percentages of differences between pairs of heads, calculated with respect to the smaller item have been compared. In this way, it seems, it is easier to spot differences in function than if differences measured in centimetres were to be taken into account for in the former case the warriors' individual preferences as to the sizes of heads played a lesser part. Some warriors for example might have preferred weapons with long blades, others with shorter ones; in the latter case the differences in lengths would be smaller even though it would not necessarily reflect the relative specialisation of the weapons.

In this method the limits of scale values were determined arbitrarily: the sizes and number of the intervals were established so that they fit the rules (which today are not so strict as they used to be[24]), on the one hand, and on the other one, to retain the comparability of the results for the respective phases. As in determining the limits of the intervals the frequency distribution of the measurements were taken into account, the picture is not blurred. Differences of at least 30% have been assumed as substantial (this limit seems to distinguish the heads sufficiently). Only well preserved heads or those damaged to a slight degree (and thus possible to reconstruct) have been taken into account[25].

The percentage differences of the lengths of the heads found in pairs in burials from phase B_1 were generally small (up to 30% - cf. Diagram 5). This may indicate that pairs of weapons of similar sizes were put in the graves (if it is assumed that the heads of similar size indicate that the shafts were also of the same length). It thus seems that pairs of similar weapons designed both for close and long distance combat were put into the graves (Fig. 3). In the case of greater differences, located in the next scale values, a clear diversification of the functions of the heads into lance- and javelin heads should be considered, yet such cases are very rare. It should not be forgotten that the phenomenon of diversification of shafted weapons was more widespread than is suggested by Diagram 5: some burials contained several (almost always two) heads, one of which had barbs (Diagrams 2-4).

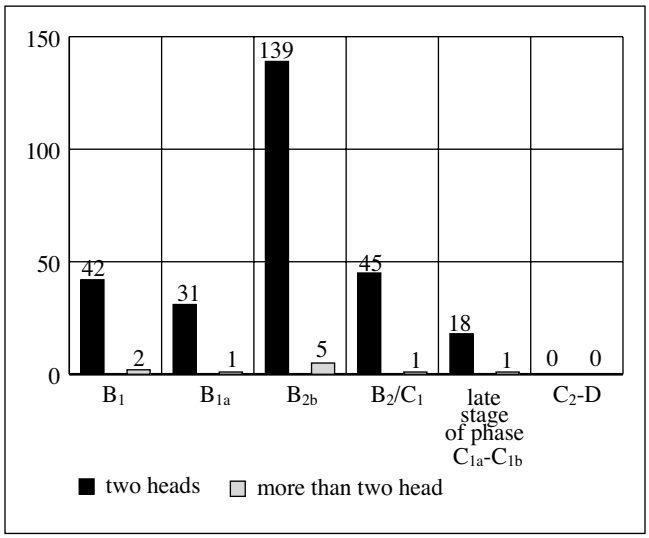

Diagram 3: *Number of graves furnished with more than one shafted weapon head in the Przeworsk Culture from the Roman Period*

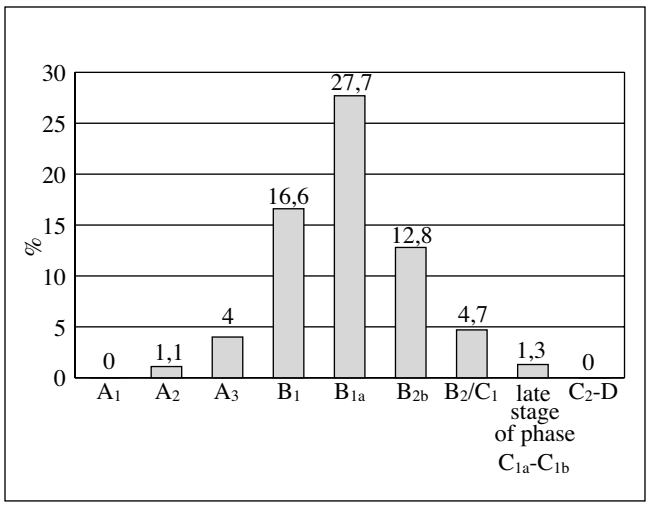

Diagram 4: *Frequency of graves furnished with barbed javelin-heads in the Przeworsk Culture.*

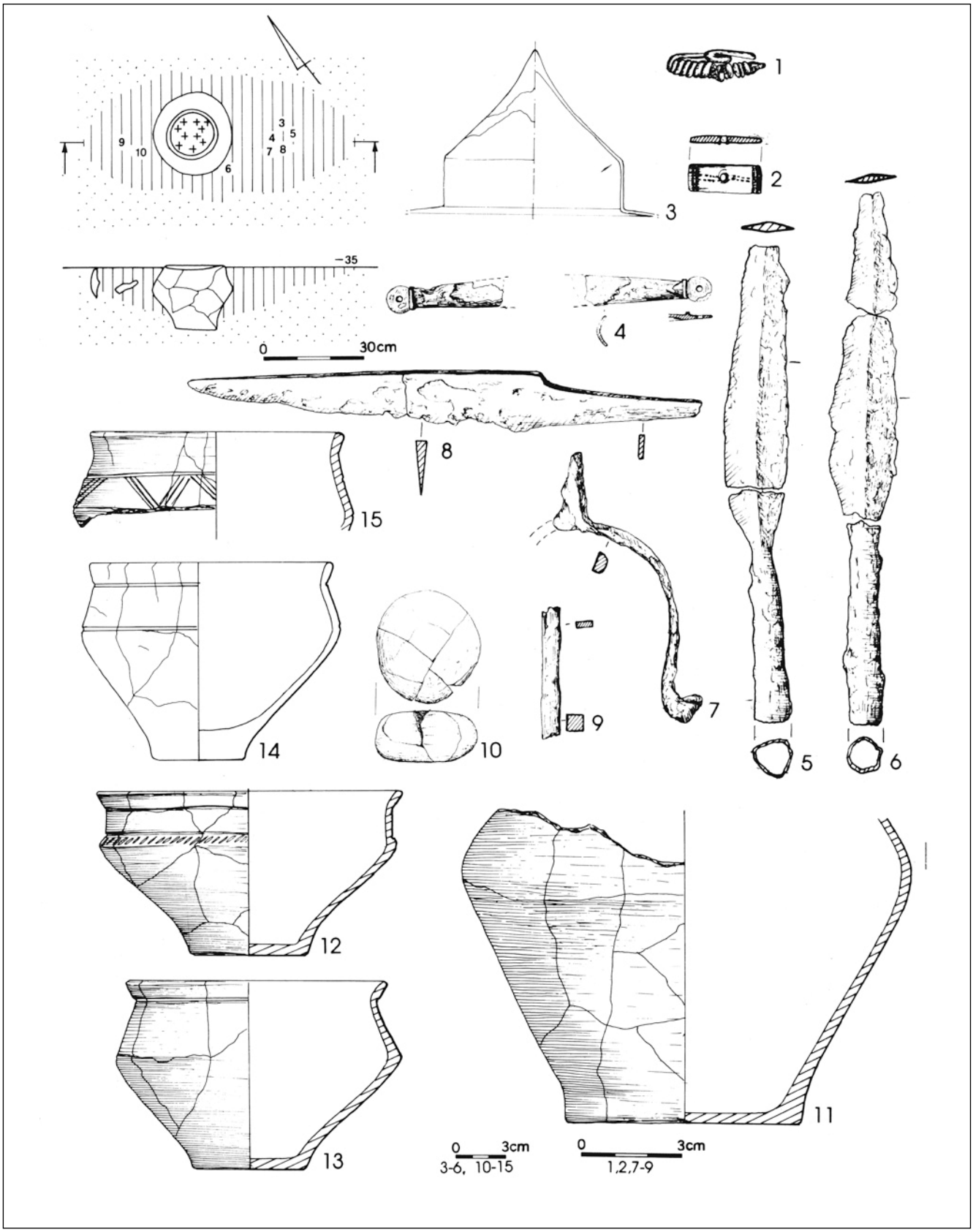

Fig. 3: *Heads of shafted weapons of almost equal sizes - grave furnishing from phase B_1: Kamieńczyk, grave 292 (*DĄBROWSKA *1997, pl. 135).*

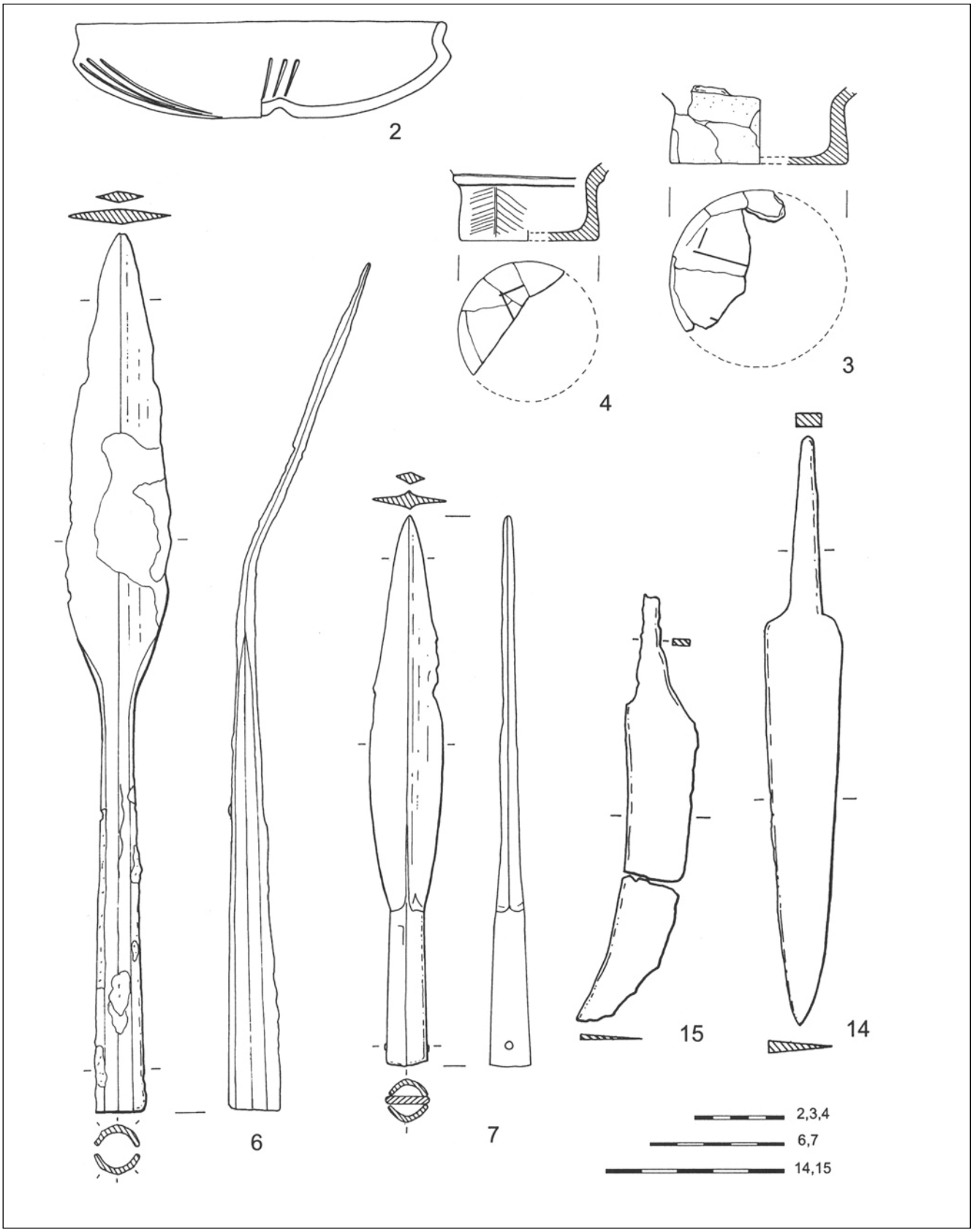

Fig. 4: *Heads of shafted weapons of unequal sizes - part of grave furnishing from phase* B_{2b}*: Chmielów Piaskowy, grave 28 (*GODŁOWSKI–WICHMAN *1998: pl. 42).*

Also in the case of the heads of shafted weapons from phase B_{2a} appearing in pairs, the differences in length were most often insignificant, although in this phase there were more cases of clear diversification (Diagram 6); the frequency of barbed heads reached its peak, which suggests that javelins played an important role (Diagram 4).

The situation changed considerably in phase B_{2b}: Diagram 7 reveals a much more frequent, clear diversification of the lengths of pairs of heads (Fig. 4). The cases fitting into the first interval are in a minority in comparison to the other results. This may indicate an increasing differentiation in the functions of the shafted weapons with leaf shape blades: universal weapons with a dual function being replaced by more functionally determined weapons: the lance and the javelin. It should not be forgotten that this phenomenon is more prominent as the diagram does not take into account pairs of heads, one of which had barbs (this phenomenon is not as frequent as in the previous phase but still significant - cf. Diagram 4).

In phase B_2/C_1 pairs of heads in burials only slightly differed in length, becoming similar in this respect compared to the results obtained for phase B_{2a}, than B_{2b} (Diagram 8). This may suggest a gradual replacing of specialised weapons (lances and javelins) by weapons of dual function (this is also indicated by the scarcity of barbed weapons in burials, cf.: Diagram 4).

Diagram 9 reveals that in the late stage of phase C_{1a} and in phase C_{1b} pairs of heads did not considerably differ in length. All the significant differences were at the same level as in the previous phase: pairs of heads of similar length were predominant. This tendency, noticeable already in the previous phase probably reflects that spears and javelins were not distinguished so much as in phase B_{2b}. This is also confirmed by the lack of barbed heads among grave goods (this takes place before the end of phase C_{1a}[26]) and rare occurrences of pairs of shafted weapon heads in burials (cf. Diagram 2).

For phases C_2-D it is impossible to draw any conclusions on the basis of differentiation of heads' sizes co-occurring in burial assemblages because no cases of two weapon heads in one feature have been recorded.

The above-presented domination of universal, bifunctional shafted weapons in burials from the Roman Period seems to be reflected by the actual military equipment as described by Tacitus in *Germania*[27]. Tacitus informs us that the weapons used by the Germans were *hasta* (Roman name for shafted weapons) with a narrow and short iron (he means the head) called the *framea*, which could be used both for stabbing and throwing[28]. According to Tacitus, mounted warriors used shields and *frameas* but foot warriors additionally had *missilia* (missiles), which they threw in greater numbers[29]. Tacitus mentions the *missilia* used as javelins. An analogy to these *missilia* can be found in Germanicus' speech described by Tacitus in the *Annales*. According to Germanicus, only the first line of the German warriors had the *hasta* and the rest used only weapons hardened by fire or short *missilia*[30]. It seems that the *missilia* described in Germania and the *tela* from the *Annales* are the same type of weapon. The information that they were predominant probably did not reflect the reality, but rather the fact that Germanicus' speech was addressed to the Roman legionnaires before a battle and its aim was to present the weaknesses of the Germans and thus to encourage the legionaries to fight.[31] The only important intelligence might concern the small number of the weapons. However, even this piece of information might be the result of Germanicus' (or Tacitus') over interpretation and in fact shorter weapons of the *framea* type were meant or other very short shafted weapons.

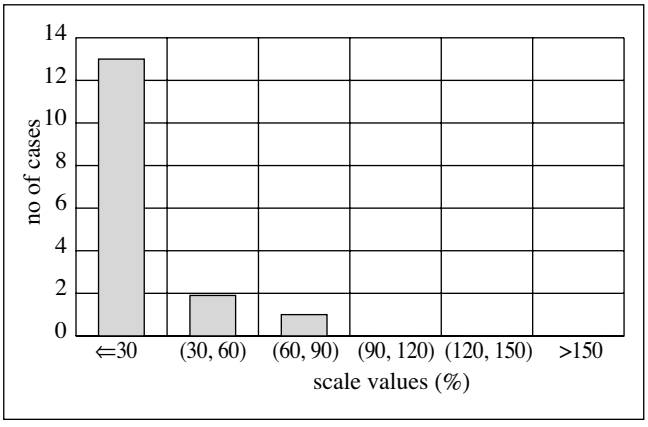

Diagram 5: *Percentage differences in length between shafted weapon heads found in graves from phase B_1*

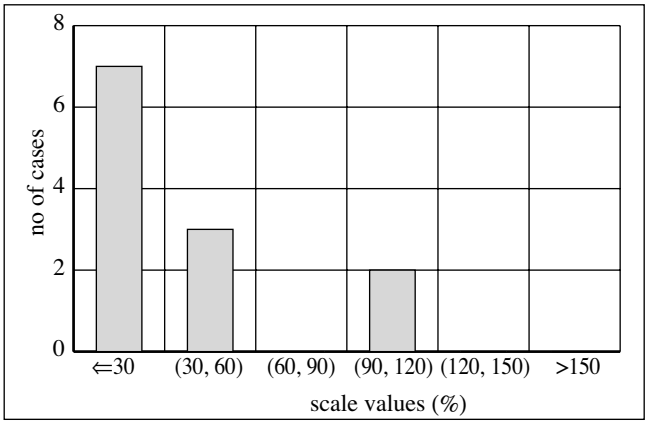

Diagram 6: *Percentage differences in length between shafted weapon heads found in graves from phase B_{2a}*

Taking into account the limitations of the Germania as a source of knowledge about the central European Barbaricum (especially as regards dating Tacitus' information to the 1st century AD and its only comparative value with respect to the areas occupied by the Przeworsk Culture[32]) it may be tentatively assumed that the *framea*, used for close combat, throwing and horseback combat, fits the above-described weapons of dual function. It is worthy to note that Tacitus' remarks about the universal character of the Germans' *framea* concern the 1st century AD which is equivalent to phase B_1 and partly B_{2a}[33] and confirms the observations made on the basis of the archaeological material of the Przeworsk Culture.

The Ancient sources cause another difficulty in interpretation concerning Germanic shafted weapons. This topic was discussed by W. Adler[34], who quotes, i.a., descriptions of large Germanic shafted weapons (*praelongae hastae*,[35] *hastae ingentes*,[36] *enormes hastae*[37]) and assigns considerable importance to these references: in his opinion the Romans believed that most of the Germans possessed shafted weapons of huge dimensions. This was supposed to concern foot warriors, as the fragment describing their combat style and weapons is taken from the *Annales*[38]. This description, however, can hardly be considered as objective, for it serves to present the usefulness of Roman weapons (short swords) in contrast to the unwieldy Germanic shafted weapons during combat in a crowded space. A similar case is the context of description of a German lance presented in Germanicus' propaganda speech mentioned above[39]. The other examples mentioned by W. Adlers concern the Batavians[40] or the Cherusci[41], that is German tribes remaining under a considerable Roman influence and thus very different from the majority of tribes living further to the east. Moreover, these descriptions depict the military defeats of the Roman army, and the Germans are presented as individuals of giant height and the size of shafted weapons is probably designed to stress this fact. Therefore Tacitus' words describing the majority of the Germans and concerning rarity of iron resulting in scarce appearance of swords and long lances seem to be more adequate[42]. The context in which this information is presented allows us to interpret the expression "long lances" as meaning weapons with well-developed metal parts (large head). Probably the shortage of iron in German lands should be treated as a *topos*, but the description of military equipment seems to reflect Tacitus' actual state of knowledge, as he tried to subordinate the known information to the *topos*.

Establishing the actual dimensions of shafted weapons would be a considerable contribution to the study of combat ways. Some information in this respect could be derived from the location of weapon heads in inhumation burials. The place where the head is found allows us to reconstruct the maximum length of a shafted weapon calculated as the section between the top of the weapon head and the intersection point of the limit of the burial pit with the axis of the head[43]. The determination would be almost certain if a spear butt were found at the extension of the axis of the head. The presence of the spear butt would also allow to determine if the shaft was broken before having been put in the grave (in this case the spear butt would not be in line with the head) and in the opposite case the length of the shafted weapon could be established quite exactly. Unfortunately, as cremation burials were predominant in the Przeworsk Culture, there is no data available about the dimensions of wooden elements of shafted weapons[44]. In this situation any attempts at reconstruction have to be based on indirect data or analogies from other cultural spheres and chronological periods.

Finds of completely preserved shafted weapons were made at bog sites in Denmark dated generally to the Younger and Late Roman Period[45]. Although at Thorsberg the iron heads were not preserved, four shafts of the lengths: 81,3 cm, 250,2 cm, 273 cm, 294,6 cm[46] were discovered[47]. At Nydam the shafts were between 230 and 305 cm long[48]. At Kragehul no complete shafted weapons were excavated[49], but at Vimose there were five such cases. The lengths of the shafts found there amounted to: 248 cm, 274,3 cm, 275,4 cm, 277,8 cm and 335,3 cm. The find of a complete shafted weapon from Vimose, which had a total length of about 50 cm (and the length of the head was ca 25 cm) was a unique discovery. The shaft was made of a slightly curved branch, not completely stripped of the bark, sharpened at one end[50] (Fig. 5a). All in all, it may be said that the shafts were usually from 240 to 300 cm in length[51]. Similar lengths of shafted weapons from bog sites are mentioned by other researchers[52]. No clear differences in length between shafts furnished with barbed heads (javelins) and shafts with heads without barbs have been recorded, but, as the sample is small, it can not be the basis for drawing any definite conclusions. It is worth referring here to the only complete shafted weapon from Nydam (Fig. 5b)[53]. It was quite long (ca 307 cm), and in its central part had a string loop (due to its small size it can not have been a loop attached to the shaft which was used to carry the weapon on the shoulder by the cavalry[54]). This made C. Engelhardt[55] consider it as a javelin[56]. However, due to its considerable size[57] this weapon was most probably used for hand to hand combat, the more so as (as the illustration in C. Engelhardt's book indicates) the loop was too short to be

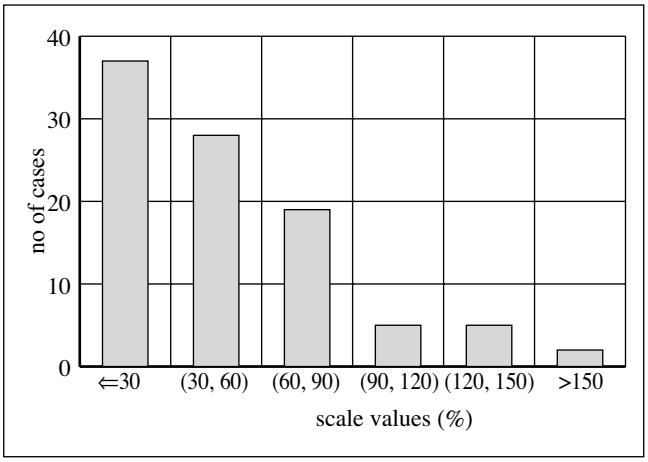

Diagram 7: *Percentage differences in length between shafted weapon heads found in graves from phase B_{2b}*

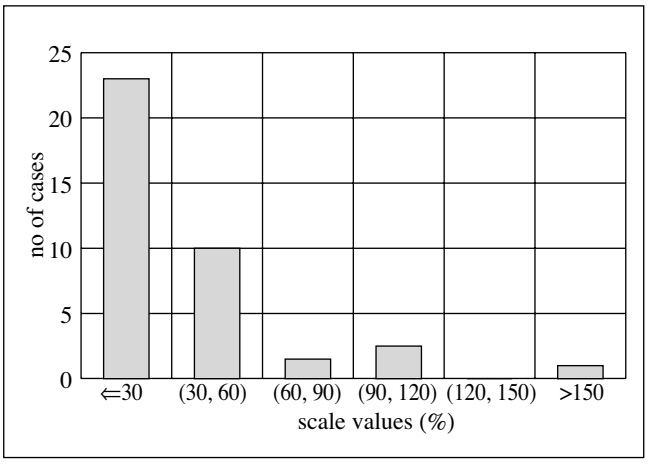

Diagram 8: *Percentage differences in length between shafted weapon heads found in graves from phase B_2/C_1*

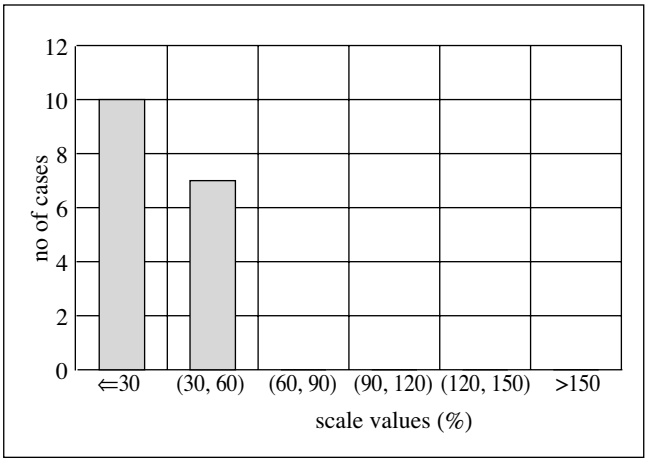

Diagram 9: *Percentage differences in length between shafted weapon heads found in graves from late stage of phase C_{1a} and phase C_{1b}*

wound around the shaft. Interestingly, in this case the very long shaft was equipped with quite a short head (ca 15 cm in length). It is not possible to study this find again today: the most recent publication of C. Engelhardt's materials reveals that none of the Nydam shafts have been completely preserved till today[58].

A tentative review of shafted weapon head finds from inhumation burials in the area of central and northern Barbaricum[59] suggests that shafts from bog finds and some burials from Scandinavia from the Younger and Late Roman Period might have been much longer than shafted weapons known from the areas of Barbaricum[60] further to the south where the total length of shafted weapons seldom exceeded 2.0 m, and usually was close to the height of the warriors. This issue can not, however, be settled definitely. It is also interesting to note that javelin heads (with barbs) and shafted weapon heads with leaf-like blades differed in length only to a small degree.

The representations of the Germanic warriors in Roman iconographic sources are not very helpful in reconstructing the sizes of shafted weapons. The main sources are sarcophagi with battle scenes and the column of Marcus Aurelius (the representations on coins or *tropaia* are too schematic in their composition and do not show the actual weapons)[61]. As the representations are subordinated to the composition of the whole work of art the sizes of the weapons may not be exact. Moreover, some of the elements in sculpted pieces have been reconstructed in modern times and thus do not reflect the original state; this concerns especially the most prominent parts of the bas-reliefs. The analysis of iconographic representations may only lead to the conclusion that shafted weapons were usually as tall as their owners[62]. An example is provided by the representations of Germanic foot warriors from the times of Marcomannic Wars imagined on the column of Marcus Aurelius (scenes LX and LXII)[63] (Fig. 6). It is also worth noting the representation of a Germanic mounted warrior in scene XXXIV, who is fighting with a slightly longer spear than the ones described above[64] (Fig. 7). Other examples are provided by the representations of Germanic infantry warriors from the Portonaccio Sarcophagus[65] (Fig. 8). In the latter[66] case the weapons represented were considerably shorter. Obviously, it is impossible to assess the precise dimensions of the weapons on the basis of these sources. This can be caused by the requirements of the composition: the figure of the fighting German was placed in the bottom left-hand corner of the battle scene as a result of which the actual dimensions of the shafted weapon could not have been represented

properly. The analysis of other representations of combat on the Roman battle sarcophagi (the form was quite popular in Rome especially from the 160's AD till ca 200 AD[67]) does not allow to assess the length of Germanic shafted weapons because no such valuable representations have been preserved (mythological representations on battle sarcophagi are prevailing). Representations of Germanic warriors are also known from the so-called bronze appliqués[68], but the parts with images of shafted weapons have not been preserved[69].

To sum up the general observations concerning shafted weapons it should be stated that probably in the Early Roman Period, despite a certain specialisation of form and functions (barbed heads which definitely belonged to javelins) the majority of shafted weapons might have been used in a two-fold way depending on the need as a lance or as a javelin. The former function was probably very important, as may be indicated by the great number of burials with single heads of shafted weapons, especially in earlier stages of the Early Roman Period. Specialisation of the heads with leaf-shaped blades appeared as late as phase B_{2b}. In that period usually pairs of heads clearly differing in sizes were put into burials, which allows us to assume that they belonged to lances and javelins. Still later, the specialisation of shafted weapons is abandoned and the frequency of burials with pairs of heads decreases. This is probably the outcome of a departure from using javelins in favour of lances or weapons designed for close combat as well as for throwing. It is not very probable that such a state resulted from the distortions caused by the decline of the burial rites which began in the late phase C_{1b}. This question was posed by K. Godłowski who compared the Przeworsk Culture grave goods with the burials from Scandinavia (where pairs of heads still occurred) on the one hand, and on the other one with the area of Germany and the so-called "Laeti" burials from Gaul (where the custom of providing the dead with only one head was predominant)[70]. This possibility is, however, quite scant for we are dealing here with a culmination of a process that began long before the change of burial rites. It should be noted that the above-mentioned decline did not concern all the Przeworsk Culture burial grounds, as it can not be observed at Korzeń, Łąck commune, district Płock, mazowieckie voivodeship[71]; no cases of pairs of shafted weapon heads in burials were found there, however[72]. It may be said that from phase C_2 additional shafted weapons ceased to be used completely.

Shafted weapons ought to be analysed also in connection with their use in horseback combat. For a start it is worth following changes in the frequencies of burials with horse

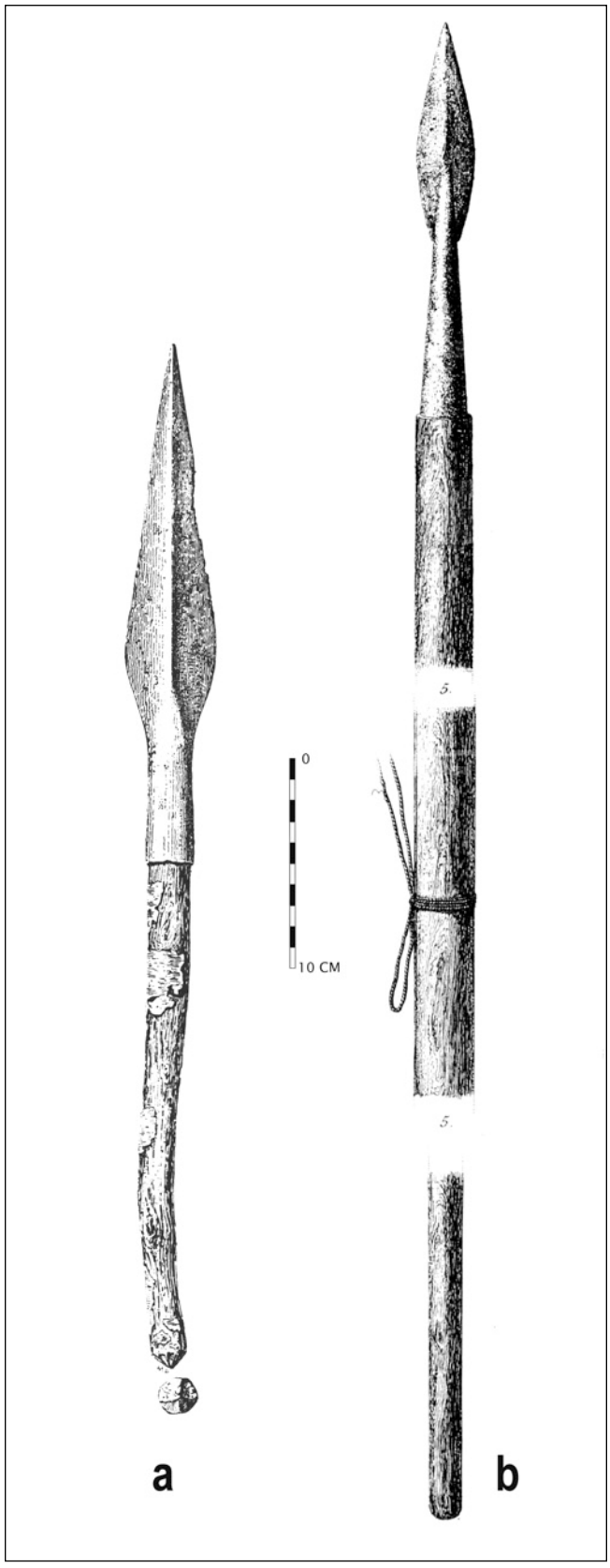

Fig. 5: *Completely preserved shafted weapons from Scandinavian bog sites: a - Vimose (*ENGELHARDT *1869, Fig. 23), b - Nydam (*ENGELHARDT *1865, pl. X: 5).*

harness[73]. (Diagram 10) The first burials with horse harness appeared in phase A_2 (which should be linked with the appearance of spurs in the Przeworsk Culture). They appeared sporadically, and slightly increased in importance in phase A_3. A significant increase took place in phase B_1, when almost every fourth burial contained items of riding equipment. This result may be to some extent explained by the fact that this paper takes into account materials from the north-eastern zone of the Przeworsk Culture. In this area, especially in the so-called Nidzica Group from phase B_1 weapons in burials appeared only exceptionally. Only the spurs remained a common element of grave goods[74]. As this area was taken into account there appeared a certain overrepresentation of spurs in contrast to other categories of military equipment. This concerns several burials[75] out of the 151 analysed ones so it does not seem that the distortion should be considerable. Thus we have a more frequent than previous custom of equipping the deceased with spurs. In phase B_{2a} burials with spurs were less numerous which to some extent may be due to the small number of burials[76]. This does not necessarily mean that spurs were no longer used but might be the a result of an inexplicable tendency to put spurs in burials more rarely. In the consecutive phases the proportion of burials with riding equipment increased until phase B_2/C_1 and the period equivalent to the late stage of phase C_{1a} and phase C_{1b}, when spurs could be found in almost every third burial with military equipment[77]. This seems to reflect the more frequent use of horses by the warriors. In phases C_2-D the spurs disappeared from grave assemblages[78], which certainly did not mean that horses were no longer used but rather a result of changes (decline) in the burial rite. It is even assumed that the horse was used in battle to a greater extent in the Younger and Late Roman Period; the importance of the horse was to be expressed in the use of longer two-edged swords equivalent to the Roman cavalry *spatha* [79] and a clear increase of the frequency of such swords in burials[80] (cf. Diagram 11). K. Godłowski accepted the possibility that the almost complete lack of spurs in burials was connected with changes in horse riding style[81]. However, in the light of the bog deposits from Scandinavia from the Younger and Late Roman Period and Early Migration Period[82] it seems that spurs were still in use at the end of the Roman Period and during the Migration Period[83].

The elements of riding equipment were often accompanied in burials by pairs of heads of unequal length. This does not have to mean that javelins were used in horseback combat, although this gave a clear advantage in contrast to foot combat as the missile was thrown from a greater height and thus had a greater range and precision[84]. Such examples were known in the Roman world, as is testified by the writings of Josephus Flavius (The Wars of the Jews, 3, 92, 5)[85]. The weapons he mentioned were smaller than normal shafted weapons and several (at least three) of them were carried in a case attached to the saddle[86]. Experiments have allowed us to see that using such weapons was connected with complicated manoeuvres requiring, a horned saddle. Without it the rider's movements (especially of his trunk) might easily make him fall. To obtain concrete benefits in such kind of combat a large number of riders was necessary, which required careful group training and expert command[87]. In the German world such a type of combat was theoretically possible in the case of centrally commanded and trained warriors, e.g., in service of such rulers as Marobodus.

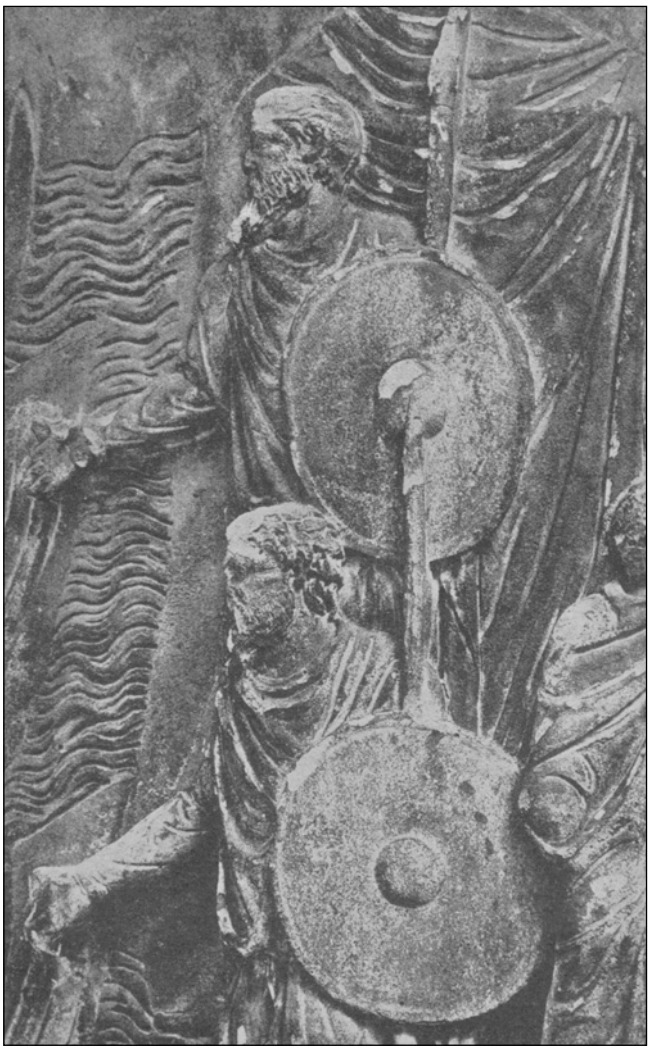

Fig. 6: *Germanic foot warriors pictured on Marcus Aurelius' column, scene LX (*HAMBERG *1936, Fig. 3).*

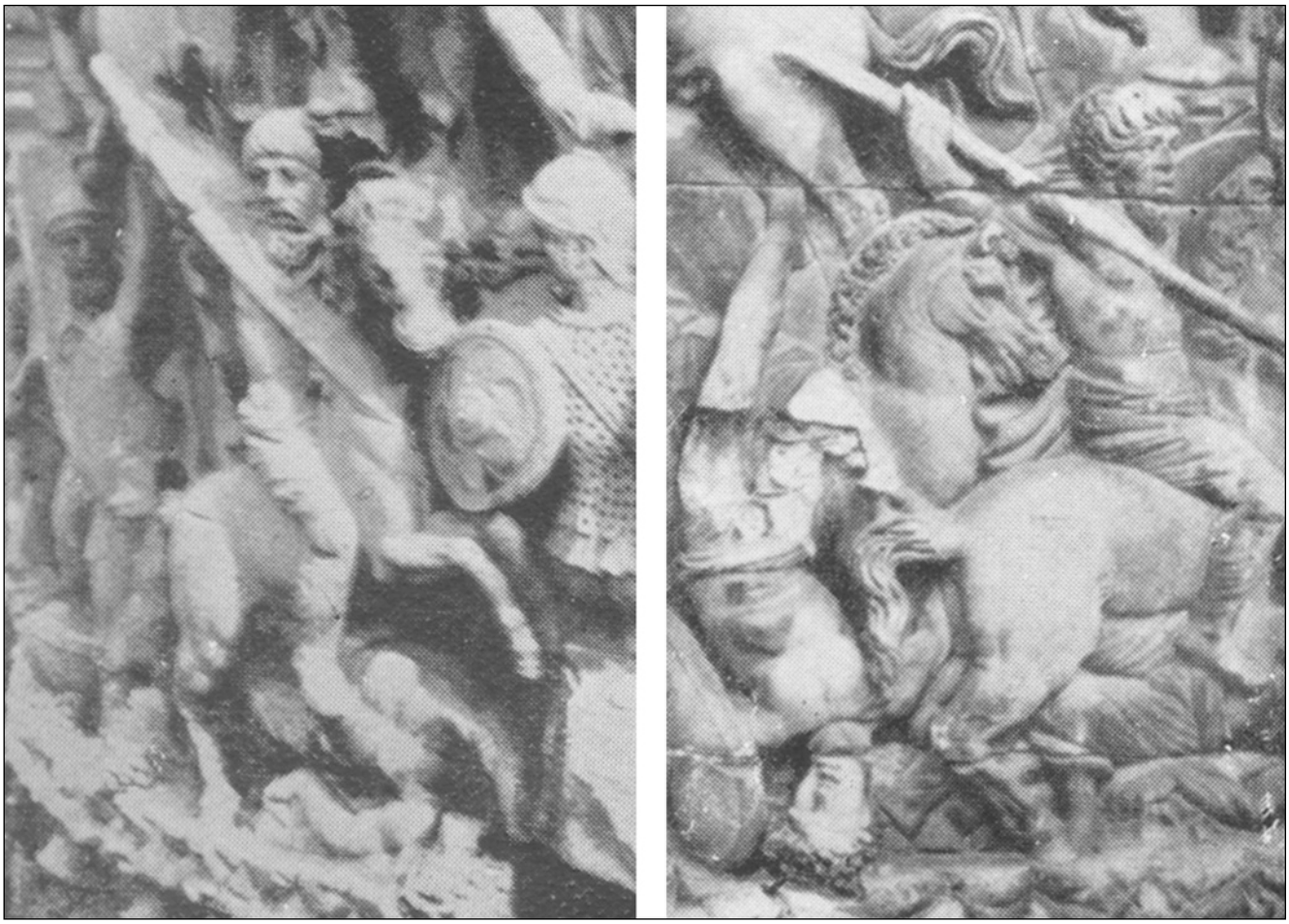

Fig. 7: *Image of a Germanic mounted warrior. Column of Marcus Aurelius, scene XXXIV (*CAPRINO *et al., 1955, Fig. 44-45).*

According to the Ancient sources he organised his state following the Roman model and had a large army (Velleius Paterculus II, 109), formed after the Roman pattern. There are no reasons to assume that the Przeworsk Culture population had any centrally commanded troops using another style of fighting than brave but uncoordinated attacks typical of the majority of the Germans[88]. Moreover, there are no reasons to believe that the Przeworsk Culture population could use the horned saddle, so important for throwing a javelin from horseback. Besides, the occurrences of more than two shafted weapon heads in one burial are very rare; this seems to exclude the possibility of using numerous javelins in the Roman style. The above observations are on a par with the information given by Tacitus that the Germanic riders, in contrast to the infantry, did not use javelins but only a shield and a *framea*. There thus arises a question as to why in burials with riding equipment pairs of shafted weapon heads occur so often? The answer may be that horses indicated the high rank of the warrior and also were a means of transport to the battle, an element facilitating chasing the enemy or, in case of defeat, escape from the battlefield. The combat

Fig. 8: *Germanic foot warrior represented on the Portonaccio Sarcophagus (*HAMBERG *1936, Fig. 14).*

potential of the horse could have been exploited rarely in "normal" battles but more significantly during short-term military actions e.g., during looting forays of the retinue (*comitatus*)[89], although as these expeditions were probably casual it is hard to assume that horses were used as a part of tactical units. They helped to move faster (greater surprise value, effectiveness of the attack, chasing the defeated, escape in case of defeat or for fear of revenge, etc.) which does not, however, exclude, plundering forays made by warriors on foot[90]. The aim was rather to use the speed offered by these animals. One should assume that they might have served as means of transport not only for mounted warriors but also infantry. Horseback without a saddle left enough room for two persons and the horse might have carried two warriors, especially for a short distance. It was probably very important in methods of fighting used by the retinue, that consisted of mounted warriors as well as infantry[91]. We may draw a conclusion that warriors possessing horses on their own were possibly located higher in the hierarchy of retinue than foot soldiers, collected from inexperienced youngsters[92]. Therefore it doesn't sound astounding that the horse is presented by Tacitus as one of the most desired war booties, together with bloodstained *framea*[93]. The latter seems to be a metaphor, but obtaining a war horse actually elevated warriors to a higher position[94].

If the reasoning presented above is correct, pairs of shafted weapons from burials with riding equipment should be interpreted as ones used after dismounting but before combat (the more so as the heads found either together with spurs or without them do not reveal any differences in form). This may also be indicated by the frequent co-occurrence of spurs and short two-edged swords, in phase B_2 meant mainly for close foot combat (mainly stabbing) not for horseback combat. The greatest number of pieces of riding gear was found in burials from phase C_1. The Ancient descriptions (e.g., of the battle of Argentoratum[95] by Ammianus Marcellinus and information by Tacitus concerning the Venethi[96]) as well as the representations of the Germans in Roman iconography (reliefs on the column of Marcus Aurelius and the Portonaccio Sarcophagus[97]) seem to indicate that only a small number of Germanic warriors fought on horseback in the Roman Period (also in the late stage of it). The fact that warrior groups did not necessarily have to be composed mainly of riders is also indicated by the bog finds from the Younger and Late Roman Period. As they were composed of weapons won in the battle from the defeated aggressors, they represent the weapons used in practice, not 'filtered' through

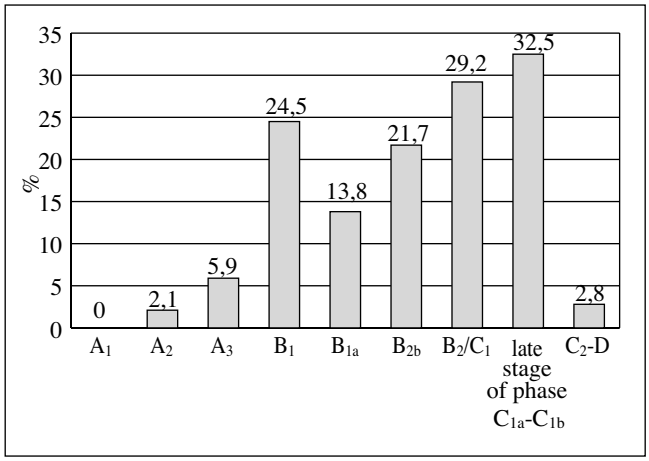

Diagram 10: *Frequency of weapon graves furnished with riding gear (spurs) in the Przeworsk Culture*

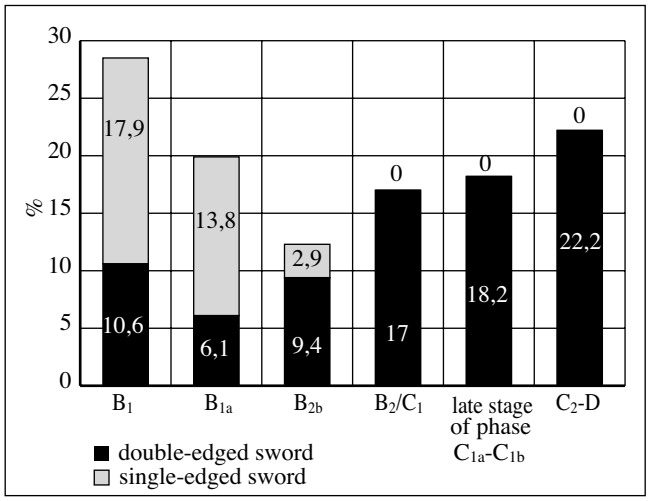

Diagram 11: *Frequency of weapon-graves furnished with swords in the Przeworsk Culture from the Roman Period*

the burial rites. The analysis of the military equipment found there allows us to conclude that only a small number of warriors had horses; they represented the highest ranks, who also possessed elements of costume and ornaments, as well as shield fittings, made of precious raw materials and richly decorated[98]. This picture may be determined to some extent by the character of the supposed attacks: the invaders most probably got to the area of the Jutland Peninsula by boat. The vessels discovered at bog sites from the Roman Period (above all Nydam boats A, B and C[99]), could not be used to transport large animals[100]. There are, however, many reasons (analyses of horse skeletons put in bogs as offerings, the stylistics of riding gear, etc.) to assume that the invaders did bring the horses or at least horse harnesses[101]. Thus the problems of transport did not preclude using the horses (the more so as there could have been other transporting units[102]), although they certainly

limited these possibilities.

In the grave assemblages from the Roman Period the elements of riding equipment were often accompanied by swords[103]; this is particularly visible in phase C_1 when the swords were long, designed for slashing and suited to horseback combat. Any attempt at establishing the way they were used in combat must be preceded by the analysis in the frequency changes of the appearance of that kind of weapon in burials (Diagram 11). In phase B_1 the frequency was high, later on it decreased to reach its minimum in phase B_{2b}. From then on there was a gradual increase until phases C_2-D. The observed variability is connected with the stylistic changes of sword forms. For that reason the division into one-edged and two-edged swords was taken into account. One-edged swords, most often used as universal, handy stabbing/slashing weapons[104] appeared rarely in grave assemblages of the Przeworsk Culture starting from the Late Pre-Roman Period[105] but they became clearly more predominant in the Early Roman Period. The frequencies presented in Diagram 11 indicate that one-edged swords were a significant element of grave goods in phases B_1 and B_{2a}. Later on, although present until phase B_{2b}, one-edged swords appeared but sporadically[106]. The above remarks generally support the previous findings[107].

Two-edged swords were very important as part of grave assemblages in the Younger and Late Pre-Roman Period although their frequency tended to decline[108]; it was continued in the Early Roman Period and the lowest ebb in the appearance of two-edged swords in burials took place in phase B_{2a}. Later on their presence gradually increased and their level became fixed at more than 15% of all weapon graves in the following chronological periods. There was an increase in phases C_2-D[109].

Two-edged swords underwent significant changes in form (see Fig. 9-11): in the Late Pre-Roman Period they were similar to the La Tène forms i. e. long swords often with blunt points, designed for slashing[110]; in the Early Roman Period besides the residue late La Tène forms and longer swords with narrow blades of type I after M. Biborski[111] designed mainly for thrusting[112], there appeared short swords similar to the Roman *gladius* (the last-mentioned ones generally from phase B_{2b}), meant for stabbing and also, to a smaller degree, for slashing. At the end of the Early Roman Period there began to appear longer two-edged swords similar to the Roman *spatha* which clearly dominated in the later periods and were basically used for cutting (except for the rapier-like forms type X and some variants of type IX and XI serving equally for stabbing)[113]. The diversity of two-edged sword forms is partly reflected in the differences of frequency apparent in Diagram 11. The decrease in the popularity of two-edged late La Tène forms was connected with the considerable disappearance of two-edged swords in general from burial assemblages; in phases B_1 and B_{2a} their position was taken over by single-edged swords[114]. The domination of two-edged swords in phase B_{2b} should be linked with the more widespread use of short double-edged swords and the domination of double-edged swords of long *spatha* type in grave assemblages of the Younger and Late Roman Period.

Although swords could be used in horseback combat (especially in the Younger and Late Roman Period), they were most probably used mainly in foot combat. This is suggested by, the Roman iconographic sources. The column of Marcus Aurelius[115] bears representations of Germanic warriors using swords in foot combat (scenes XV, XX, XXIX, XLIII, CIX) as well as a rider in a military context equipped with a sword as the only element of offensive equipment (scene XXVIII)[116].

Similar conclusions are indicated by the Scandinavian bog finds from Illerup Place A and Ejsbøl Nord where a large number of long swords were discovered, yet only most spectacular group of them (with particularly ornamental hilts) could be linked with the few elements of riding equipment. This allows to assume that a large proportion of warriors using swords fought on foot[117].

An important element of the defensive, but also offensive, military equipment was the shield. On the basis of the collected material from the Late Pre-Roman Period and the Roman Period it is possible to observe the following changes in the frequencies of burials with metal shield fittings[118] (Diagram 12): in phase A_1 the proportion of analysed sets was considerably large in comparison with phase A_2. This difference, however, may be only apparent due to the small statistical sample for phase A_1 [119]. From the end of the Late Pre-Roman Period (phase A_3[120]) the shields with metal fittings gained in importance and until the end of the Early Roman Period they appeared in similar frequencies (slightly more than every second weapon grave contained metal shield fittings). There was a relatively higher (in contrast to the preceding and following phases) frequency of shield fittings in phase B_{2a}. It seems that this increase is a result of the above discussed limitations resulting from a large number of burials dated generally to phase B_2. Due to the potentially significant 'influence' of these burials on the results for phase B_{2a} it can not be assumed that this 'oscillation' reflects reality. A considerable increase can

be observed for phase B_2/C_1, which might to some extent have been the outcome of closer contacts in the sphere of weapons (including the shields) with the Roman world. There can be found in literature, for example some mentions of the influence of Roman weaponry on the popularity of hemispherical shield bosses type 8 after M. Jahn[121] in the Younger and Late Roman Period, probably resulting from direct contacts between Germans and Romans during the Marcomannic Wars[122]. It may thus be that this influence is reflected also in the popularity of metal shield fittings. In the later period (the late stage of phase C_{1a} and phase C_{1b}) the shields with metal fittings became less widespread in burials but still remained at a higher level than in the Early Roman Period. This decline may be only apparent for a considerable proportion of burials dated broadly to the Younger and Late Roman Period contained fragments of shield fittings[123]. The high frequency of burials with shield metal fittings in the chronological period equivalent to phases C_2-D may be due to the changes in the burial rite as a result of which the grave goods became poorer (in that period shield fittings were very often the only element of military equipment in burials perhaps symbolising the whole of weapons; more often than previously the graves contained shield grip fragments without shield bosses[124].

Equipping the dead with shields does not have to be reflected in the archaeological material. As cremation was the predominant burial rite in the Przeworsk Culture (the deceased were burnt with whole equipment) the possible cases of placing on the funeral pyre of shields made only of organic materials can not be traced. It seems that such shields may have been quite popular in the Roman Period[125]. They were certainly more frequent in the Late Pre-Roman Period, especially in its earlier phases, which is proved by the small proportion of burials with metal fittings from that period and also archaeological finds of shields of organic materials from the Pre-Roman Period. At a bog site dated to the 4th century BC[126] at Hjørtspring on the Isle of Als in Denmark ca 100 shields[127] were discovered, made entirely of wood, not one equipped with a metal shield boss, grip or a fitting[128]. Moreover, the Celts, who had a huge influence on the Przeworsk Culture military equipment frequently used wooden shields. One may even imagine ones made of wicker[129] or wood and skin as proved by the bog find from Clonoura, Tipperary county (Ireland), where the shield with cover, *umbo* and edge strengthening made of skin was found[130]. This may suggest that such shields were often used in that period, in the Przeworsk Culture. In the Roman Period the discussed shields, although not so numerous (the proportion of burials with weapons equipped with shields with fittings is clearly higher) must have retained a certain importance. This is proved by the finds of wooden shields from bog sites at Vimose in Funen[131] (not fewer than 5 wooden shield bosses[132]) and Thorsberg (wicker[133] and wooden shield boss)[134]. An important premise is provided by Tacitus' *Annales*. The Roman author makes Germanicus, encouraging the legionnaires to fight the Germans, speak about the weakness of Germanic shields made of "osiers woven together or of thin and painted board"[135]. Germanicus' propaganda speech aims at contrasting the Roman and Germanic military equipment thus it probably does not entirely reflect the reality. However, the fact that the Germans used shields made completely from organic materials is in its light quite probable. The question remains only about the scale of the phenomenon which is probably presented untruly in Germanicus' speech. There are more premises that Germans used entirely organic shields in the Roman Period. One should remember images of Germanic shields with no room for a metal shield boss. Such a shield is presented on bas-relief from Marcus Aurelius' column (scene LXXVII[136]). The shield is shown from the inner side, equipped with two shield grips: the longer around warrior's forearm and shorter held by hand (Fig. 12). Obviously grips made of organic materials are viewed here as they seem to be flexible, not stiff. Such kind of a shield was less intended to be used offensively than one with an umbo (smaller range, less manouvreability, lack of strong hitting part) although it is still possible, for example to hit the enemy's face with the use of a shield edge[137].

The popularity of metal shield fittings in burial assemblages, which culminated during phase C_1 should not be treated as a result of differences in the popularity of the shields themselves. The shield was the basic element of protective equipment with a very important offensive function, especially specimens with shield bosses[138]. The forms of the bosses prove that such shields had to be used to attack (Fig. 9-11). They were often furnished with piercing spikes, e.g., the earlier types 6, 7b and 7a after M. Jahn[139]. *Umbos* with a pointed spike (type Jahn 7b) seem to be the most efficient. They were popular in phase B_{2a} i.e. late stage of 1st-beginning of 2nd century AD. Their offensive use is probably corroborated by Tacitus' information concerning Germanic auxiliary cohorts. The Roman historian claims in "The Life of Agricola" that Germans used the shields as offensive weapons pricking opponents in their faces employing the shield bosses during the attack at the Battle of Mons Graupius in Caledonia in 83 AD[140]. The

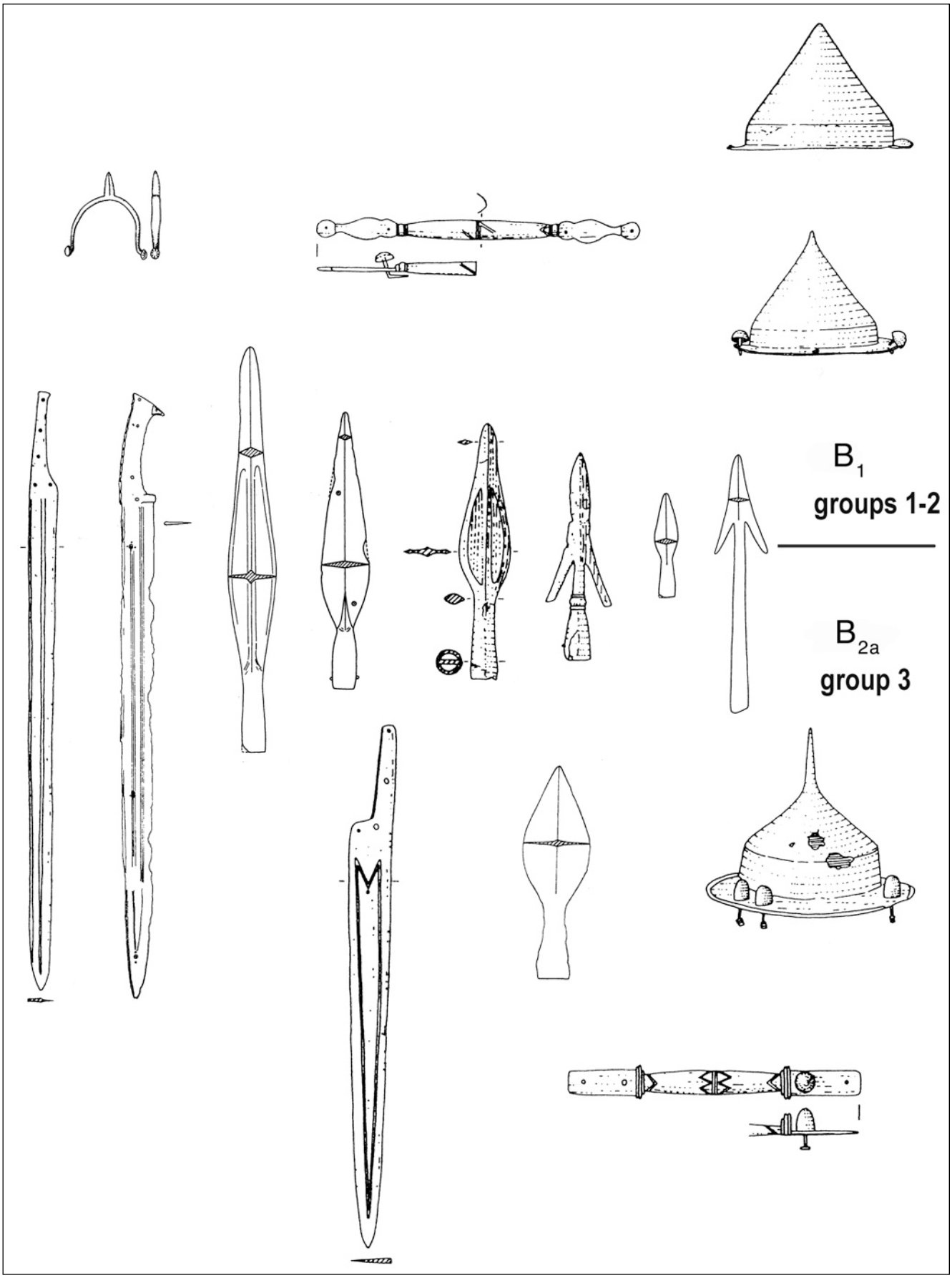

Fig. 9: *Chronological groups of weapon graves; phases* B_1-B_{2a} *(after* GODŁOWSKI *1994a, supplemented by the author).*

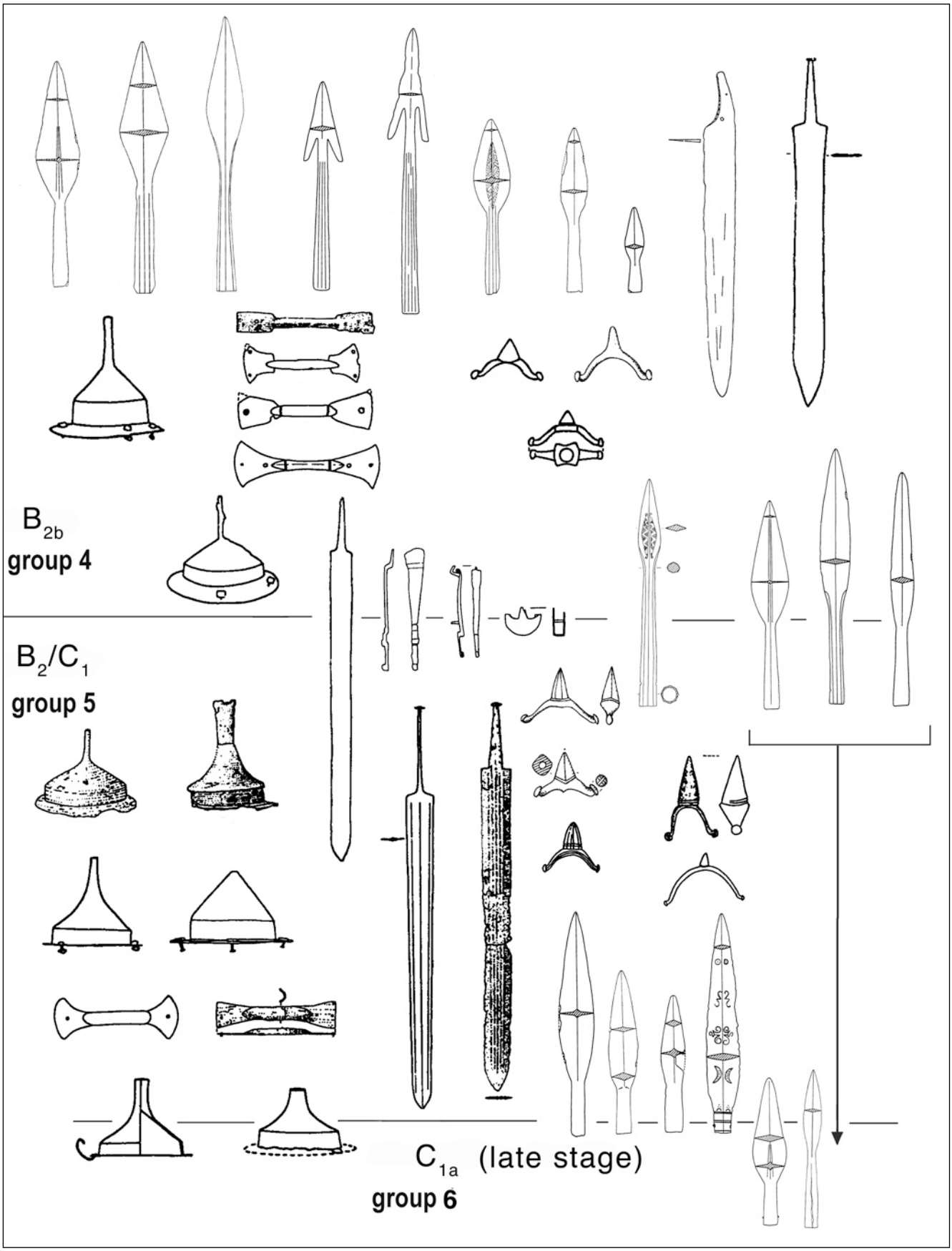

Fig. 10: *Chronological groups of weapon graves; phases B_{2b}-C_{1a} (after* GODŁOWSKI *1994a, supplemented by the author).*

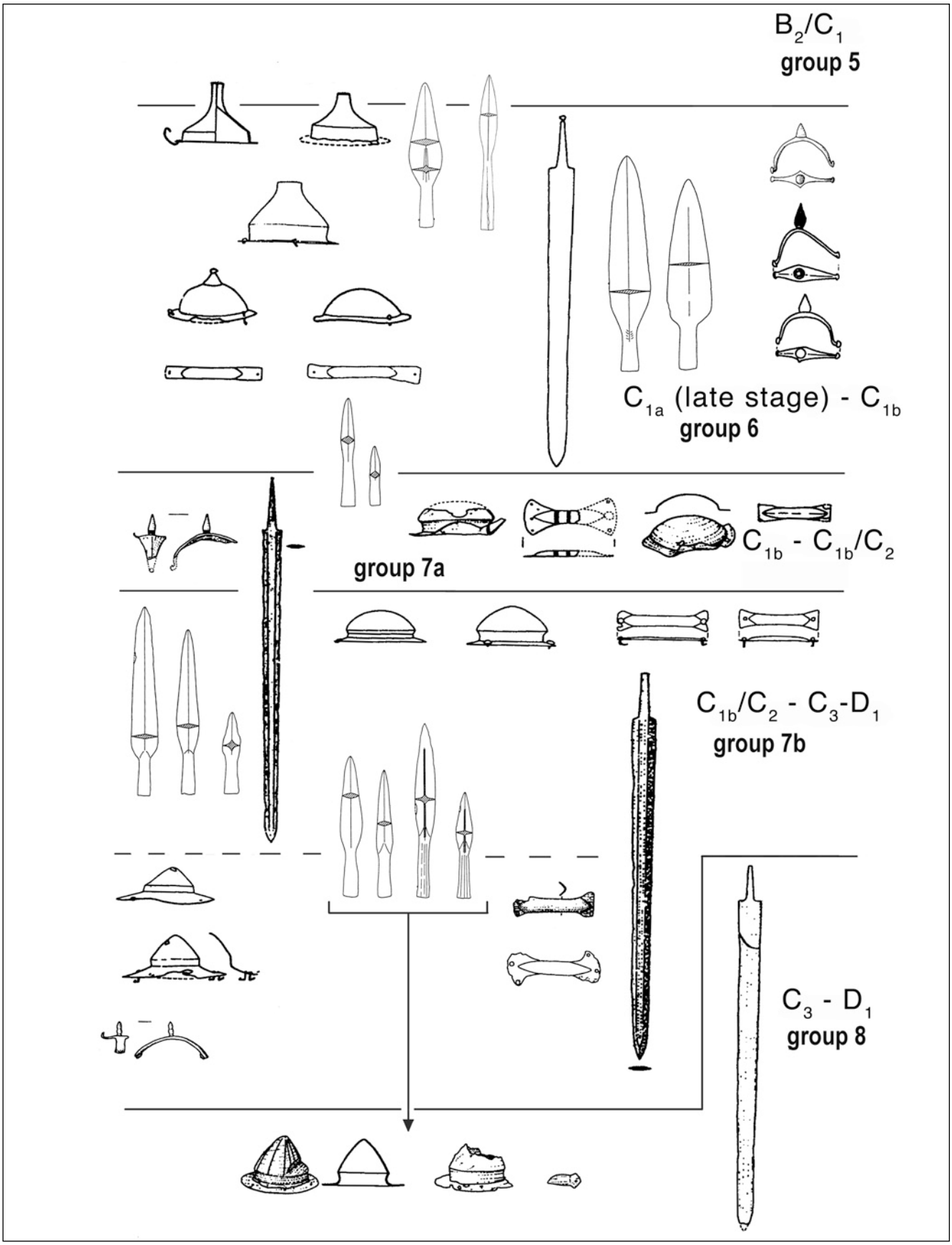

Fig. 11: *Chronological groups of weapon graves; phases C1b-D (after* GODŁOWSKI *1994a, supplemented by the author).*

popularity of shield bosses with pointed spikes and information given by Tacitus stand in surprising chronological accordance. The question arises as to why such a terrible weapon was abandoned. In my opinion pointed spikes, although effective, were too weak (spiked examples are frequently found with traces of damage, appearing during fighting, e.g., the previously mentioned shield boss from Nasławice). Therefore they were replaced by *umbos* with blunt spikes (type Jahn 7a) almost equally effective but far more durable. That is why the latter had been used for more than 100 years (at least phases B_{2b}, B_2/C_1).

The form of a shield is also of great importance. Unfortunately, organic materials do not survive but we may draw some conclusions by taking into consideration metal edge fittings from graves and rare analogies from other areas of barbarian Europe: skeleton graves with remnants of wood as well as edge fittings are known from Scandinavia, e.g. Hunn, Borge k., Norway[141] and uniquely also from Eastern Germany e.g., Wachow, Kr. Nauen[142]. One should not forget numerous Scandinavian bog finds, like for example Vædebro in Eastern Jutland[143]. However it should stressed that we have another source of information at our disposal. These are miniatures of shields found in the female and child graves in the Przeworsk Culture, generally from the Early Roman Period (Fig. 13)[144]. It is believed that they reflect the shape of shields actually used in battle. Summing up the above sources of information we may presume that in the Early Roman Period, the Przeworsk Culture population generally used smaller elongated shields of rectangular or hexagonal shape (sometimes with slightly curved longer edges) intended mainly for close-combat[145]. Later on (phase C_{1b}) a new form of shield bosses appeared. Their hemispherical shape was probably influenced by a Roman pattern[146]. They had developed in their own, local way. The hemispherical form of a shield boss might indicate the alteration of fighting technique. Such an *umbo* is good for parrying the blows of enemy's weapons, which slid on their surface; it is not intended mainly for offensive use (the same concerns its Roman prototype). We have to remember the Younger and Late Roman shields from Scandinavia that changed significantly with the adoption of hemispherical shield bosses. There are several dozens of reconstructed shields known from that area. Almost all of them are circular, roughly 1m in diameter (Fig. 14)[147]. Such huge shields seem to be clearly defensive not only because of characteristics of hemispherical *umbos*, but also because of their ability to shelter the body of a warrior. Together with lesser manouvreability it seems to be proven that we have shields used in ordered battle array. This is confirmed by a certain hierarchy of Scandinavian warriors deduced from artefacts found in bog sites; it manifests in the differentiation of quality and quantity of weapons (shields, swords and scabbards), belts and horse harness[148]. Central organization of Scandinavian quasi-armies are confirmed also by the standardization of weapons e.g., shafted weapon heads produced in standard form in great numbers[149]. They were probably in possession of military chiefs who dispensed them among warriors before a fight or military expedition[150].

In the Przeworsk Culture the situation was not so clear in the Younger and Late Roman Period. There are several findings of knee shaped or straight edge fittings from graves, which suggests that offensive shields were still in use, and the adoption of hemispherical shield fittings didn' t

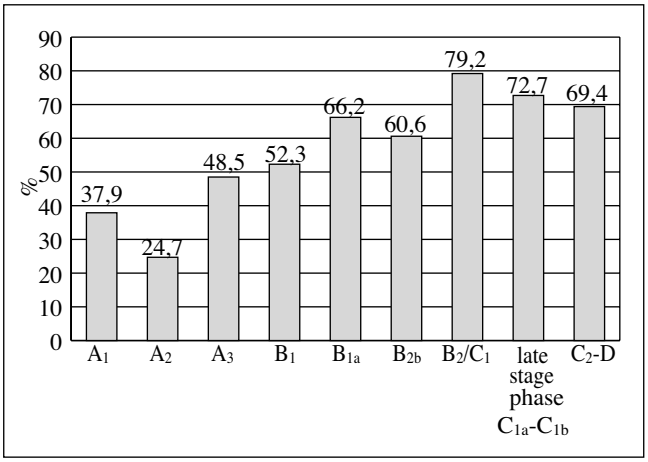

Diagram 12: *Frequency of weapon-graves furnished with metal shield fittings in the Przeworsk Culture*

Fig. 12: *Representation of a Germanic shield equipped with two organic (?) grips. Column of Marcus Aurelius, scene LXXVII (*CAPRINO *et al., 1955, pl. M).*

change everything as regards to fighting techniques[151]. It is worth remembering here the hypothesis of K. Raddatz, who noticed that the introduction of metal shield fittings (including hemispherical ones!) in the Pre-Roman Period was caused by the appearance of strong slashing swords[152]. The shields with fittings are expected to be more resistant to hacking blows, in which the shield boss was used to receive the blows, and also, as it seems, the shield planks were thicker under a shield boss. This factor might have also played a part in the Late Roman Period when the Przeworsk Culture burials frequently contained high quality swords (including Roman imports) of greater and greater lengths and widths, and thus of greater striking power.

It is also worth noting that in the Roman Period the Przeworsk Culture burials frequently contained offensive weapons (usually the heads) which were not accompanied by shield fittings[153]. This brings to mind M. Gebühr's conception adopted by W. Adler and A. Gundelwein[154], concerning the possibility of using shafted weapons as the only element of military equipment (the supporting argument were the cuts visible on the heads from bog sites in Scandinavia which are treated as traces of combat). This concept, however, does not seem very convincing[155]. Therefore the change in frequency of burials with shield fittings should be treated in the way presented above, i.e. as a proof that metal fittings were used in different degrees and not the shields themselves.

The use of the bow as an element of military equipment is a separate problem. The changes in the frequencies of burials with arrowheads presented in Diagram 13 clearly indicate that the role of arrows as an element of grave goods was very minor, although in phases C_2-D it slightly increased[156]. In the light of the above the suggestion by K. Godłowski, who believed that arrowheads became clearly more frequent in phase B_{2b}[157] does not seem justified, but his claim of their increased popularity in the final phase of the period analysed in this paper[158] (especially phases C_2-D) is confirmed. In the late stage of phase C_{1a}-C_{1b} the frequency of burials with arrowheads is rather low, although slightly higher than that presented in Diagram 13[159]. The problem of the number of arrowheads found in burials has also been discussed in literature. K. Godłowski, based on the Przeworsk Culture materials from Upper Silesia, estimated that arrowheads appeared most frequently in compact sets of from two to seven items, and cases of single arrowheads are very seldom[160]. However, the data collected here (Diagram 14) indicates a predominance of single arrowheads; their greater numbers have been registered from the Younger and Late Roman Period but it is unclear if the small set of data allows us to draw such far-reaching conclusions.

There arises the question of whether the bow could have been used in combat, which concerns to a greater extent the latest part of the analysed period, when arrowheads became more frequent in burial assemblages than in the preceding one. As it seems, in order to use the bow effectively, it was necessary to create separate units located, for example, at the wings of the group of warriors, in order to support an infantry attack[161]. The existence of such units, which probably required central command (in order to synchronise the archers' actions with other groups) seems possible in Scandinavia, where traces of supposedly developed political structures have been discovered and a developed hierarchy of warriors existed, noticeable in the materials from the bog sites. For the Przeworsk Culture the theory is much weaker. The possiblity can not, however, be excluded that the bow was a hunting weapon used in combat in an occasional and uncoordinated manner. Some valid indications are provided by the analysis of the Nydam finds, where the largest series of bows from the Younger and Late Roman Period or Early Migration Period were discovered. This category of artefact was studied quite a long time ago[162], recently a precise reconstruction of these weapons has been made through experiments and complemented with an assessment of their effectiveness[163]. The bows from Nydam represented longbows approximately as tall as men, or even taller[164]. There are, however, serious doubts as to their function; first of all the bows from Nydam seem to differ strongly in quality[165], and secondly, the considerable height of the leaf-shaped arrowheads with sleeves[166] suggests that they were used for non-military purposes (hunting) as their weight limited the effective range of the weapon and frequently also the quality of their shafts made of pine wood was quite poor[167]. One of the Nydam bows was examined in detail: it had a surprisingly low (17 Kg) draw weight for a combat bow[168]. For the purposes of further assessment eight replicas of Nydam bows were made with draw weights of 22,5-27 Kg. The experiments have shown that at a distance 25-130 m the arrows did not pierce the replicas of shields so that the arrowhead did not reach the internal side of the planks. It was also proved that needle-like tanged arrowheads seem to be more efficient, as although they did not pierce the shield, they reached deeper into the planks, effectively making the use of a shield covered with scattered sharp points of the arrowheads more difficult. Arrows with such heads had uniform effectiveness whereas leaf-shaped arrowheads depended on whether they hit along the fibres on the planks of the shield (more effective) or across them (less effective); moreover leaf-shaped

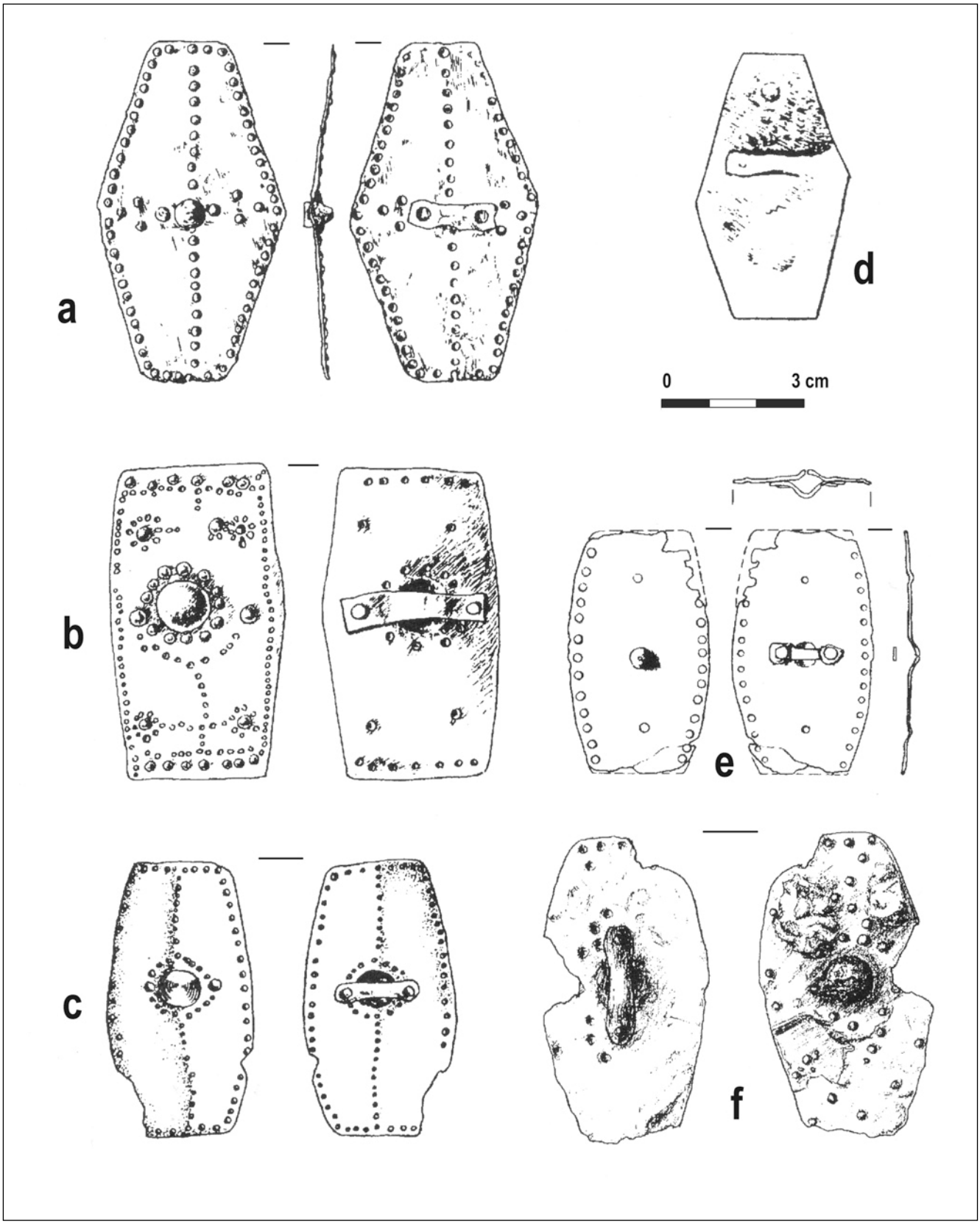

Fig. 13: *Miniature shields from the territory of Poland: a - Nadkole, grave 141B, b - Siemiechów, grave 46, c - Siemiechów, grave 39, d - Siemianice, grave 24, e - Nowy Targ, grave 69, f - Siemianice, unknown grave (*ANDRZEJOWSKI *2000, fig. 2); a-d, f: specimens from the Przeworsk Culture, e - specimen from the Wielbark Culture.*

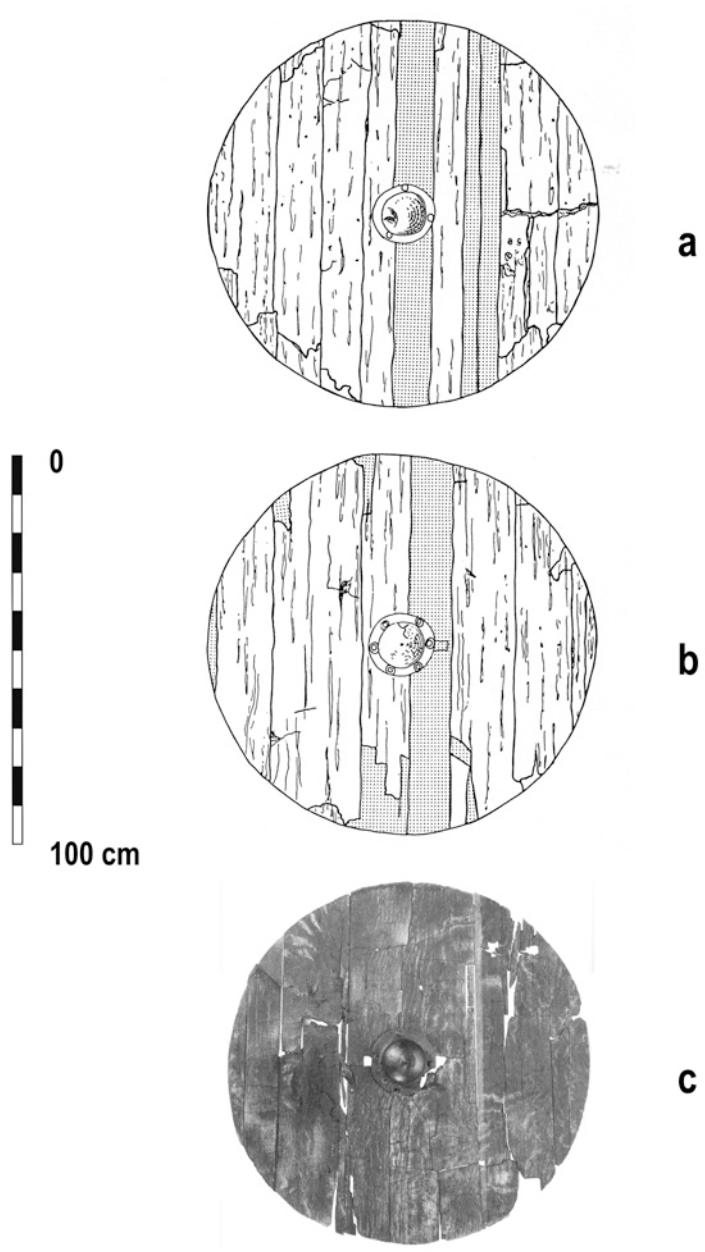

Fig. 14: *Late Roman Scandinavian circular shields: a-b - Thorsberg (*RADDATZ *1987, fig. 21), c - shield SATF from Illerup (*ILKJÆR *2001, fig. 199).*

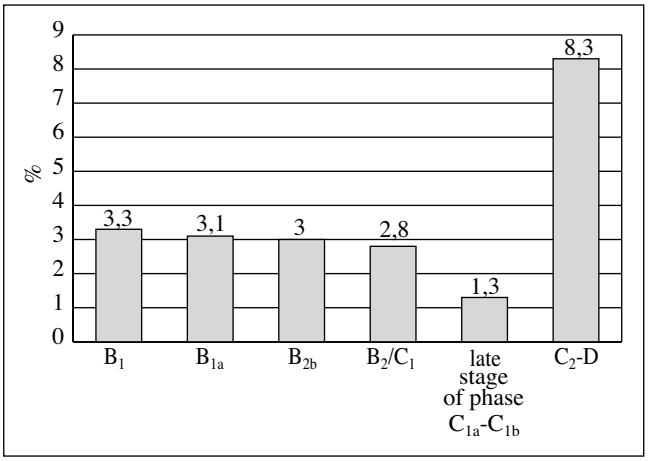

Diagram 13: *Frequency of graves furnished with arrowheads in the Przeworsk Culture from the Roman Period*

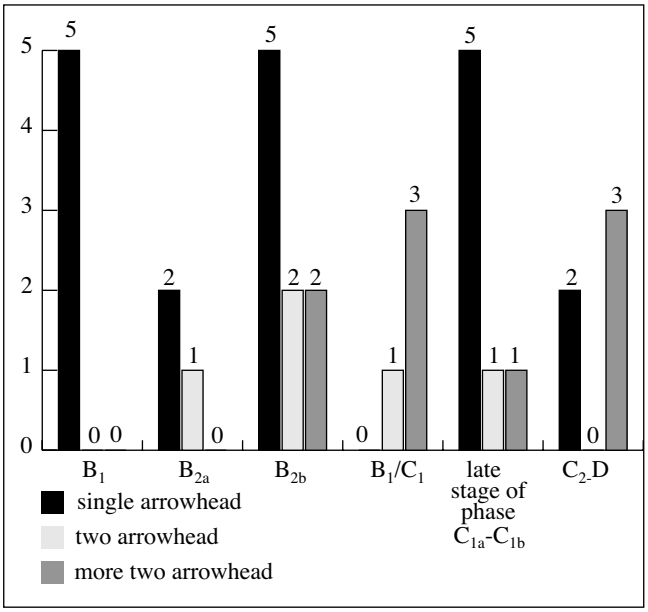

Diagram 14: *Numbers of arrowheads in the Przeworsk Culture graves from the Roman Period*

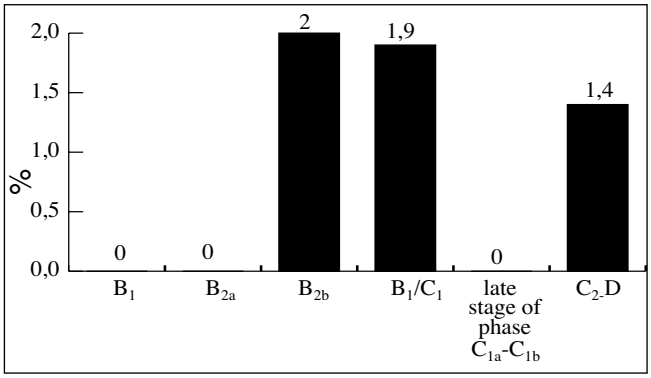

Diagram 15: *Frequency of weapon graves furnished with axes in the Przeworsk Culture from the Roman Period.*

arrowheads were more easily destroyed when hitting the shield-boss than needle-shaped ones (Fig. 15a-b)[169]. Although H. Paulsen concludes that the Nydam bows could have been used either in combat or for hunting, he believes that only 8 of the 23 bows and 80 of at least 193 arrows[170] could have been used for military purposes. Therefore a great deal of caution should be taken when considering the military use of bows in the Przeworsk Culture, especially as the registered arrowheads represented the less effective leaf-shaped type (Fig. 15c)[171]. For the same reason the probability of the postulated substantial change of combat methods in the Younger and Late Roman Period resulting from the use of bows[172], which was tentatively interpreted as the outcome of the adaptation of the Barbarian weaponry to fighting with the Roman army[173], should be considered as doubtful.

Judging from their minimal representation in the burial finds, the role of the axe in the Przeworsk Culture military equipment in the Roman Period was less than that of the bow (the frequencies for the axes reached very low values, not exceeding 2%; as a result there is no basis to make statements about any trends) (Diagram 15). The above-presented state of affairs indicates that axes were used by the population occasionally as weapons, perhaps as a borrowing from the Elbe river basin where, especially in the Younger and Late Roman Period, they were quite frequent in the burial assemblages[174]. In contrast to the Elbe Cultural Circle, Luboszyce Culture or the Laeti' burials in Gaul[175] this kind of weapon was not an important element of Przeworsk Culture population military equipment. There are also doubts as to the function of the battleaxes: they were treated as weapons[176] or as tools[177]. The former possibility seems to be more convincing.

To conclude (Fig. 16) it should be remarked that in the light of the results presented above the basic offensive weapons were shafted weapons used most probably in foot combat. As in the Early Roman Period there predominated in burials pairs of shafted weapon heads of double functions (*framea?*) or representing lances and javelins (especially in phase B_{2b} but also earlier, taking into account barbed javelin-heads). Then - if it is assumed that they reflected the actual military gear - it should be claimed that combat began with throwing one weapon (javelin) towards the enemy (combat with the use of two shafted weapons and a shield at the same time has to be excluded). Probably this was done when running towards the enemy, which helped to increase the power and range of the missile[178]. In close combat the second

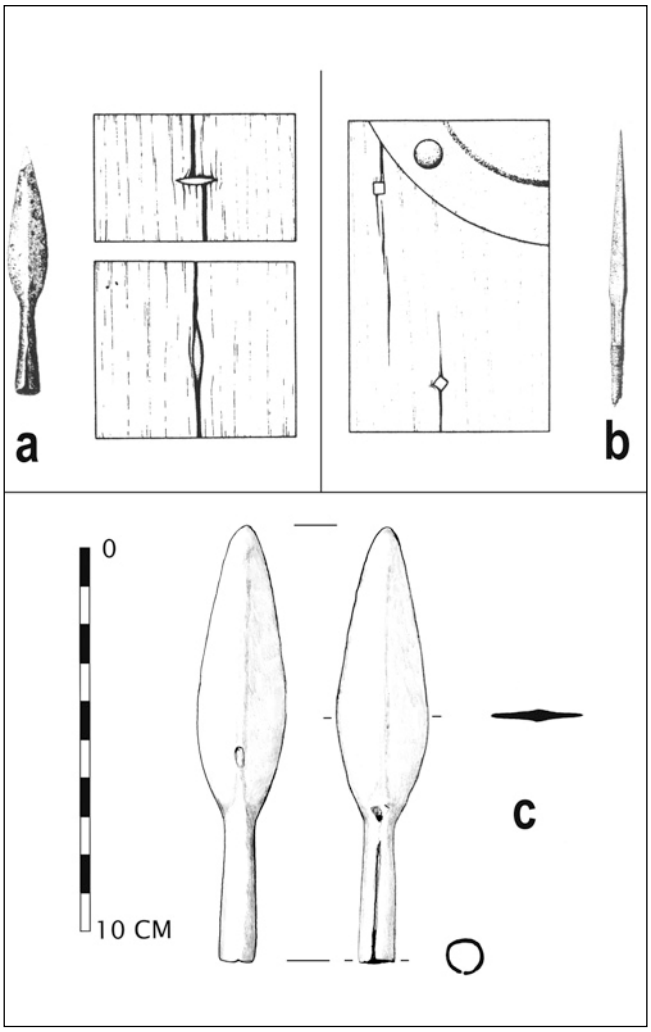

Fig. 15: *Barbarian arrowheads. Effectiveness of two forms of arrowheads from Scandinavia: a - leaf-shaped, b - needle-like; c - example of leaf-shaped arrowhead from Maliszów, Syców commune in Lower Silesia (the Przeworsk Culture); a-b - after* PAULSEN *1998, Fig. 18;* ENGELHARDT *1865, pl. XII: 22, 29; c - drawn by B. Kontny.*

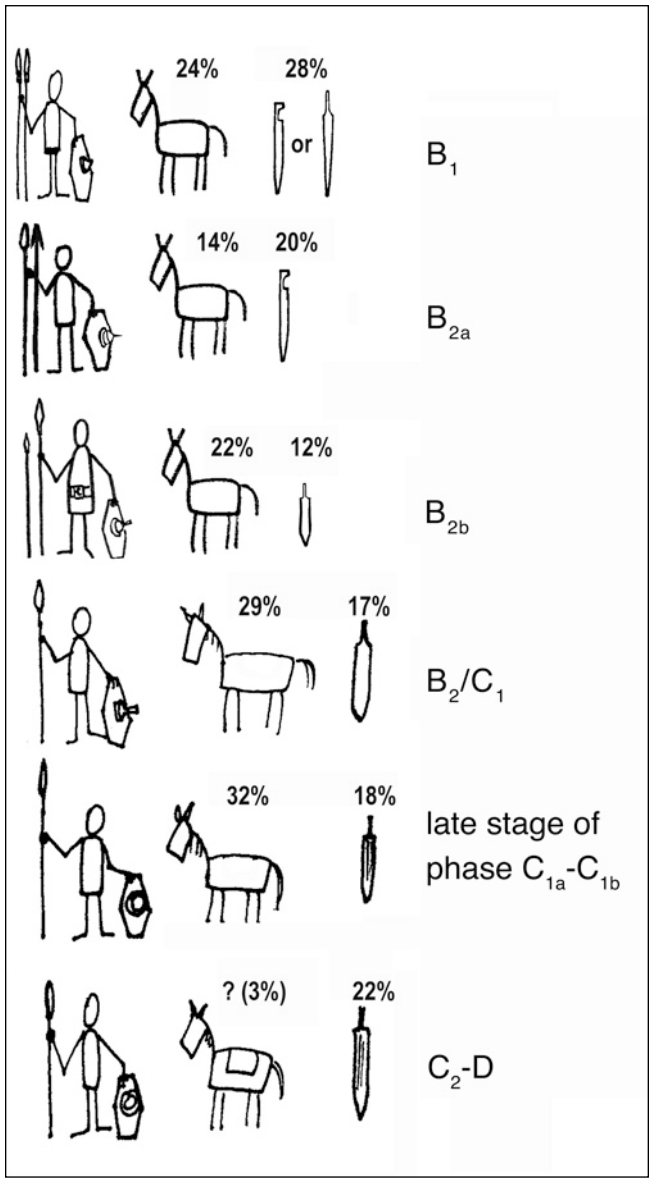

Fig. 16: *Reconstruction of weapon sets from the Przeworsk Culture in the Roman Period.*

shafted weapon or sword were used, the latter probably by a minority of warriors: more affluent or ones with better fighting skills i.e. professionals who could easily pillage swords. The horse probably played a small part in combat and was rarely used in direct encounters (with the momentous exception of possible looting forays). It served mainly as a means or transport or as an indication of the warrior's rank, and therefore it was very important for warriors. This probably concerns also the Younger and Late Roman Period, which does not have to be undermined by the fact that the weapon sets from phase C_1 often contained elements of riding gear. It is also possible that the increase of the proportion of burials with spurs among the burials with weapons of the Przeworsk Culture might have been connected with more frequent war expeditions, including, perhaps the Marcomannic Wars[179]. There are no premises, however, to assume that the possible increased use of horses resulted in creating regular cavalry troops following the Roman model. In the later periods (phases C_2-D) the spurs disappeared from burial assemblages, which was the outcome of the change (decline) of the burial rite. Long, slashing swords for horseback combat found in burials from the Younger and Late Roman Period were, as it seems, also used in foot combat. It is possible that the greater popularity of metal shield fittings was caused by the appearance of strong slashing swords and served to make the shields with metal fittings more resistant to hacking blows.

Fig. 17: *Furious attack of Germanic warriors: archaeological picnic - "Iron Roots" in Nowa Słupia (photo: M. Osojca).*

The changes in the Younger and Late Roman Period were accompanied by the decreased proportion of burials with more than one shafted weapon head, which ended in their complete disappearance. This is probably due to the fact that the javelins were replaced by lances or weapons designed for both close combat and throwing. The bow was less popular in that period than has been assumed and it is doubtful if it was designed for combat.

As it was mentioned above, the Przeworsk Culture population probably generally fought without central command (Fig. 17). The Germans' lack of discipline and regular array is mentioned by Tacitus (Tac., *Annales* I, 45). Such a view of Germanic style of fighting was obvious for the Romans; there are other examples in Ancient literary sources indicating the disorderly combat style of the Germans[180]. However one cannot omit the Tacitus' conception of *cuneus* (wedge-like array). He claimed that "their [Germans] line of battle is drawn up in a wedge-like formation"[181]. This concept might have been taken from the nomadic, eastern style of fighting. In my opinion it should be compared with the other statement of Tacitus', that when retinue "went into battle, it was a disgrace for the chief to be surpassed in valour, a disgrace for his followers not to equal the valour of the chief"[182]. Moreover Germanic wedge-like formations, instead of being formed by chance or by a fortuitous gathering, were composed of families and clans[183]. The most likely explanation is that *cuneus* was not a real order but a naturally formed shape: a chief attacked vigorously drawing the rest of warriors into following him. The more brave or more strictly related the warrior was, the closer to the chief he ran. Therefore *cuneus* may be treated rather as an expression of interpersonal connections than the actual formation.

NOTES

1. E.g., HAMBERG 1936; ENGSTRÖM 1992; cf. ADLER 1993, 249-251.
2. EGGERS 1951.
3. On this subject cf. e.g., KOBYLIŃSKI 1988, 57-58; URBAŃCZYK 1988; KOZŁOWSKI–KACZANOWSKI 1998, 10-11, Fig. 1.
4. LIANA 1968; CZARNECKA 1992, 90-91.
5. Nevertheless it should be mentioned that we may diminish such negative circumstances to a certain degree, by using comparative materials from Scandinavian bog sites. They are a very important source of information concerning weapons from the Roman Period. In their case remains of vast quantities of weapons, probably spoils of war, were put into shallow lakes or bogs after ritual destruction. Organic materials from bogs frequently survived in a very good state of preservation, which gives us the idea about appearance of the complete weapon (shafts, bows, shield planks,

scabbards are confirmed). Although absent on the territory of the Przeworsk Culture, they should be used as a complementary material in studies of the latter.

6. SZYDŁOWSKI 1964; CZARNECKA 1992, 18, with further literature.
7. Cf. the remarks on the grave goods from the so-called Masłomęcz Group in the Younger and Late Roman Period: KOKOWSKI 1999, 103-104.
8. MĄCZYŃSKA 1994; MĄCZYŃSKA–RUDNICKA 1998.
9. UCKO 1969, Mc HUGH 1999.
10. Cf. ZIELING 1989, 321-326, Fig. 17-18; KONTNY 2001a, 120, Fig. 4.
11. The analyses presented in this paper are based on the materials collected for my doctoral dissertation: KONTNY 2001b. The catalogue of that work contains 1357 Przeworsk Culture weapon graves from the Roman Period. Before the analysis a selection was made in order to exclude burial assemblages whose structure was disturbed or where no suitable observations as to their context were made, e.g., they were the result of accidental discoveries or unprofessional excavations. As a result 894 burial assemblages were used in the statistical part of the paper. The chronological divisions are made following K. Godłowski who distinguished the groups of burials with weapons: GODŁOWSKI 1992; GODŁOWSKI 1994a; GODŁOWSKI 1994b; phase B_1 equals groups 1-2, phase B_{2a} - group 3, B_{2b} - group 4, B_2/C_1 - group 5, late part of phase C_{1a} i phase C_{1b} - group 6, phases C_2-D - groups 7a, 7b and 8. An important supplement to K. Godłowski's findings was the introduction of the classification of shafted weapon heads: KACZANOWSKI 1995; contrary to popular opinion some types of shafted weapon heads occurred within surprisingly precise chronological determinants. Sometimes, in order to obtain a longer temporal perspective of the analysed phenomena, data from the Late Pre-Roman Period (after KONTNY 2002a) was also taken into account. It should be noted that not all the analysed phases had similar numbers of burials with weapons (respectively: 151, 65, 203, 106, 77, 72). The remaining burials are not precisely dated. Thus the obtained results reflect the burial rites the least precisely for phases C_2-D (a long period of time with a small number of burials with weapons), and also for phase B_{2a} (in comparison to the number of burials dated precisely for that phase a large number of burials is dated broadly to longer periods, embracing phase B_{2a}). "As refers to an absolute chronology, the phases used in the text are dated as follows – the Late Pre-Roman Period:
    A_1 – early 2nd century BC;
    A_2 – from the first decades of the second half of the 2nd century BC till ca mid-1st century BC;
    A_3 – from ca mid-1st century BC till the end of the first decade AD; the Roman Period:
    B_1 – till ca 75/80 AD;
    B_{2a} – last quarter of the 1st century - early 2nd century AD,
    B_{2b} – till ca 160 AD;
    B_2/C_1 – till ca 200 AD; late part of phase
    C_{1a} and phase C_{1b} – till ca 260 AD;
    C_2-D – till the early 4th century AD;
    It should be added that the Younger Roman Period equals phases C_1-C_2 and the Late Roman Period – phase C_3 (see GODŁOWSKI 1992b, footnote 1). Here the latter is included in wider time span covering phases C_2-D.
12. Represented by heads and quite rarely, by spear butts.
13. As the literature contains a certain lack of clarity as to the terms used (cf. e.g., FLETCHER–LOCK 1995, 28-29; ŁOMNICKI 1999, 28) I would like to stress that I understand the number as the number of cases of appearance of a given category and by frequency as a parameter most often determined by the ratio of the number (measured) and the number of the population.
14. The above result would be changed only slightly if burials dated imprecisely were to be taken into account: out of the 64 burials from phase B_2 46 contained shafted weapons (71,9%), and out of the 47 burials dated to phases B_{2b}-C_{1a} 28 burials were equipped in this way (59,6%). The change of frequency of burials with shafted weapons could perhaps concern phase B_{2a} or B_2/C_1, yet it would not fall below several per cent.
15. It should be noted that among the 64 burials dated broadly to phase B_2 16 contained more than one shafted weapon head (25,0%). If these burials were distributed evenly within phases B_{2a} and B_{2b} (proportionally to the length of the phase) the proportions for phases B_{2a} and B_{2b} would fall by only a few per cent. The 'correction' for phases B_{2b} and B_2/C_1 (6 burials out of 47, containing several heads, which yields 12,8%) would be at a similar level. It is impossible to assess how exactly the distribution of burials dated imprecisely would look, but it seems that it can not differ considerably from the above calculations. Therefore the frequency of burials with several shafted weapon heads would remain greatest in phase B_{2b} if a similar proportion with respect to the frequencies of burials from phases B2a and B_2/C_1 is retained.
16. GODŁOWSKI 1992a, 80.
17. This conclusion is not changed by the analysis of imprecisely dated burials, where more than two heads appear very seldom.
18. KACZANOWSKI 1995, 39.
19. GODŁOWSKI 1992a, 78, 80.
20. These results seem to be reliable: in the burials dated broadly to phases B_1-B_{2a} and B_2 there sometimes appear barbed heads; later they are almost completely nonexistent. Thus if the imprecisely dated burials could be taken into account, the picture might not

have changed in a valid way, and if so, then the high frequency of barbed heads in burials from phases B_1 and B_{2a} would be stressed.

21. Shafted weapons are theoretically divided into two categories: the 'spear' (or 'lance') and the 'javelin.' The former is supposed to be used in hand to hand combat and the javelin from a distance, i.e., used for throwing; cf. NADOLSKI 1951, 150; NADOLSKI 1954, 51; WOŁĄGIEWICZOWIE 1963, 11; GODŁOWSKI 1977, 52; FOGEL 1979, 88; FOGEL 1982, 97; KACZANOWSKI 1995, 9.
22. Cf. NADOLSKI 1954, 51; WOŁĄGIEWICZOWIE 1963, 11; NOWAKOWSKI 1991, 69; GODŁOWSKI 1977, 53; KACZANOWSKI 1995, 9.
23. Naturally, it should be borne in mind that in such an approach simplifications are bound to appear, for the organic parts of the weapons are not known and the function of a weapon was also determined by the dimensions and form of the shaft, and perhaps the presence of other devices facilitating throwing, e.g., a loop wrapped around the shaft into which the middle and index fingers were inserted (during the throw the string or the thong would unwind, causing the shaft to spin, which increased the length of the throw: see ŻUKOWSKI 1988, 6). Similar loops were often used in various armies of the Ancient world: some of the Roman pila (weapons designed exclusively as missiles) were equipped in it: BISHOP–COULSTON 1993, 66 or javelins used in Greek armies: WARRY 1995, 46, 50. The above traits of weapons are impossible to discover in the Przeworsk culture because of the predominant in it custom of cremation.
24. ŁOMNICKI 1999, 27-28.
25. So far the attempts at distinguishing the functions of heads on the basis of metrical data followed a justified, as it seems, premise that the larger dimensions of the head indicate lance-heads and the smaller - javelin heads. Such attempts were, however, quite subjective, as the intervals characteristic for the lengths of lance- and javelin-heads were established arbitrarily. For example, K. Godłowski assumed that a shafted weapon head shorter than 15 cm is a javelin head, 15-30 cm represented a weapon designed both for hand to hand combat and for throwing, and of more than 30 cm, a lance-head: GODŁOWSKI 1977, 53. W. Adler, when dealing with the heads from the Lower Elbe basin determined analogical intervals with the boundaries at: up till 15 cm, 15-19 cm, and more than 19 cm: ADLER 1993, n. 483. It should not be forgotten that the lengths of heads and shafts of weapons probably depended on the individual preferences of the warriors. On the contrary, a strict standardisation suggests that the weapons were mass-produced, perhaps on order of the military chiefs; heads of shafted weapon from Deposit A at Illerup and from deposit Ejsbøl Nord are treated in this way by C. von Carnap-Bornheim: von CARNAP–BORNHEIM, 1992, 50.
26. KACZANOWSKI 1995, 39, pl. XXI.
27. In this paper there are quite frequent parallels made between the Przeworsk Culture population and the Germans. Although this is a simplification, it seems justified: the Lugii, who inhabited the areas connected with the Przeworsk Culture today (or at least with a considerable part of its territory) can be considered as part of the German Suebi: KOLENDO 1999, 227, 230; KOLENDO 2004).
28. Tac., *Germania* 6, 1: "They carry a spear (*framea* is their name for it), with a narrow and short head, but so sharp and easy to wield that the same weapon serves, according to circumstances, for close or distant conflict"; *"hastas vel ipsorum vocabulo frameas gerunt angusto et brevi ferro, sed ita acri et ad usum habili, ut eodem telo, prout ratio poscit, vel comminus vel eminus pugnent*".
29. Tac., *Germ*. 6, 1: "As for the horse-soldier, he is satisfied with a shield and spear; the foot-soldiers also scatter showers of missiles each man having several and hurling them to an immense distance"; "*et eques quidem scuto frameaque contentus est, pedites et missilia spargunt, pluraque singuli, atque in immensum vibrant*".
30. Tac., *Annales* II, 14: "If their first line is armed with spears, the rest have only weapons hardened by fire or very short"; "*primam utcumque aciem hastatam, ceteris praeusta aut brevia tela*".
31. Obviously, these words can not be treated as a verbatim report of Germanicus' speech; however, they probably express a common opinion held by the Romans, which gives this information a considerable value.
32. Cf. KOLENDO 1998, 58, 61.
33. KOLENDO 1998, 58.
34. ADLER 1993, 241-245.
35. Tacitus, *Annales* 2, 21; *Historia* 5,18.
36. Tac., *Ann*. I, 65 (W. Adler quotes incorrectly: Tac. *Ann*. 1, 64).
37. Tac., *Ann*. II, 14.
38. Tac., *Ann*. II, 21: "for their vast host in so confined a space could neither thrust out nor recover their immense lances"; "*cum ingens multitudo artis locis praeolongas hastas non protenderet, non colligeret...*".
39. Tac., *Ann*. II, 14: "(...) For the huge shields and unwieldy lances of the barbarians cannot, amid trunks of trees and brushwood that springs from the ground, be so well managed as our pila and swords and closefitting armour."; "*nec enim immensa barbarorum scuta, enormis hastas inter truncos arborum et enata humo virgulta perinde haberi quam pila et gladios et haerentia corpori tegmina*".
40. Tac., *Hist*. V, 18.
41. Tac., *Ann*. 1, 65.
42. Tac., *Germ*. 6, 1: "(...) iron is not plentiful with them, as we infer

from the character of their weapons. But few use swords or long lances."; "*Ne ferrum quidem superest, sicut ex genere telorum colligitur, rari gladiis aut maioribus lanceis utuntur*".

43. Of course this should be treated with caution as the head could have shifted during the post-deposition processes.
44. Among the rare inhumation burials from the Przeworsk Culture one should mention the imprecisely dated grave 1 from Konin, loco commune, Konin district, wielkopolskie voivodeship where the fragmentarily preserved head of a shafted weapon was found under the deceased's skull: KOSTRZEWSKI B. 1947, 196-197. The poor state of preservation of the artefact and the unsatisfactory description of the context of its find do not allow us to draw any far-reaching conclusions, although it was located near the skull. The weapons (sword, shield boss, head) were found also in an inhumation burial from Trześnia, Górzyce commune, Tarnobrzeg district, podkarpackie voivodeship, dated on the base of shield boss type 6 after M. Jahn: JAHN 1916, most probably to phase B_{1c}: DEMETRYKIEWICZ 1897, 155-156, Fig. 14. Unfortunately, the accidental character of the find does not allow us to reconstruct the locations of the finds in the burial pit. Another find is dated to the Early Roman Period or the beginning of the Younger and Late Roman Period. It came from grave 158 at Nowa Wieś Wrocławska, Kąty Wrocławskie commune, Wrocław district, dolnośląskie voivodeship. As the discovery was accidental there is no information as to where the find was located in the burial pit: PESCHECK 1939, 349. Also the find of a barbed head from grave 2 at Jordanów Śląski, loco commune, Wrocław district, dolnośląskie voivodeship, has not been precisely located within the feature: PESCHECK 1939, 316-317. In grave 1 from Polwica, Domaniów commune, Oława district, dolnośląskie voivodeship, a skeleton lying on its back was discovered. Near the skull, at the axis of the skeleton there was a shafted weapon head ca 31 cm in length. The burial pit was only 90 cm long and the legs of the skeleton were bent at the knees (the dead body was probably pushed into the pit): PESCHECK 1939, 388; therefore it is impossible to determine whether the total length of the shafted weapon was equal to the length of the pit, i.e., ca 90 cm (the shaft of the weapon might have been broken so as to fit it into the burial pit). Grave 45 from Inowrocław, loco commune, Inowrocław district, kujawsko-pomorskie voivodeship, site 55, dated to phases C_{1b}-C_2 contained the remains of an 18-20 year-old person of undetermined sex, although it is supposed that they belonged to a woman (a necklace of glass beads was found at the neck). One head of a shafted weapon (22.8 cm long and 3.1 cm wide) discovered among the grave goods was not, unfortunately, marked on the plan of the feature or located in a descriptive form: BEDNARCZYK 1994, so it is not a reliable source for the present analysis. Also a double inhumation burial (or perhaps two separate inhumation burials) discovered accidentally at Nowa Wieś Legnicka, Legnickie Pole commune, Legnica district, dolnośląskie voivodeship: TACKENBERG 1925, 65, pl. 30; GODŁOWSKI 1994a, Fig. 1:71, dated to phases C_3-D_1 (group 8 of weapon-graves after K. Godłowski) was not documented in a way allowing us to determine the location of the respective grave goods. The head of shafted weapon from Grave 5 at Żerniki Wielkie, Żórawina commune, Wrocław district, dolnośląskie voivodeship (21.5 cm long and 3.9 cm wide) dated to phase D, was discovered at the feet of an adult man's skeleton (the dimensions of the pit were not recorded precisely): ZOTZ 1935, 61-62, 91, Fig. 3, 34. The above data can not be considered as significant: only in the case of grave 1 from Konin, grave 1 from Polwica, and grave 5 from Żerniki Wielkie is it possible to determine the location of the shafted weapon heads, which, however, does not always allow us to establish the possible lengths of the shafts. For that reason it is necessary to use analogies.
45. Cf. ILKJÆR 1990, Fig. 201.
46. ENGELHARDT 1863, 48.
47. It should be noted that the weapons deposited at Thorsberg do not correspond to Scandinavian military equipment. On the basis of the archaeological material J. Ilkjær established that this is a deposit of weapons from the area of northern Germany: ILKJÆR 1994a, 133-134.
48. ENGELHARDT 1865, 27.
49. ENGELHARDT 1867, 5.
50. ENGELHARDT 1869, 21-22, Fig. 23. As the end of the shaft is not well-worked it seems probable that originally the weapon was longer but was damaged during combat and then hastily adapted for further use, e.g., by making it shorter and sharpening the broken shaft, or, which seems more probable, fixed on a new shaft (this may be proved by the irregularity of its form; actually it is simply a branch). Fortunately the analysed specimen has survived and the above observation is positively verified. Nevertheless one should be very careful drawing conclusions on the basis of such short shafts, as we probably have to deal with fragments cut from longer shafts as is proved by their sharp ends (oral information for which I'm grateful to Xenia Pauli Jensen, working on materials from Vimose). This is obviously not the case for the specimen mentioned above.
51. ENGELHARDT 1866, 56. He gives the lengths in inches and feet which had to be calculated into centimetres. The errors which may result due to this are minimal and can be disregarded.
52. JAHN 1916, 60; GEBÜHR 1980, 79.
53. ENGELHARDT 1865, pl. X:5.
54. Cf. GRADOWSKI–ŻYGULSKI jun., 1998, 52.
55. ENGELHARDT 1866, 78.
56. As has been mentioned above, specific use of such loops might have served to increase the range and stabilise the flight of the

javelin.

57. For comparison: the total length of athletic javelins is between 260 and 270 cm: ŻUKOWSKI 1988, 71.
58. BEMMANN–BEMMANN 1998a, 171; BEMMANN–BEMMANN 1998b, 145-146.
59. KONTNY 2001b, 113-118.
60. The differences in lengths between shafted weapons from bog sites and the reconstructions made on the basis of the representations of Germanic weapons from Roman iconography were mentioned by G. Hamberg: HAMBERG 1936, 30. The considerable dimensions of the weapons from bog finds made C. Engelhardt assume that these were riders' weapons: ENGELHARDT 1866, 57, 59. It is, however, hard to accept this view today.
61. HAMBERG 1936, 31; SCHYMALLA 1987, 4-5.
62. HAMBERG 1936, 25, 30, 42; LEUBE 1978, 336.
63. CAPRINO et al., 1955, Fig. 75, 77, pl. D.
64. CAPRINO et al., 1955, Fig. 44-45.
65. Both artefacts are dated to 180-190 A.D.: KOCH & SICHTERMANN 1982, 91; KLEINER 1992, 301; cf. GODŁOWSKI 1992b, 50; GODŁOWSKI 1994a, 175. It is equivalent to phase B_2/C_1.
66. KLEINER 1992, Fig. 269; KRIERER 1995, pl. 34-40.
67. KOCH–SICHTERMANN 1982, 90-91.
68. BIEŃKOWSKI 1913; BIEŃKOWSKI 1914; BIEŃKOWSKI 1928, Fig. 34-35.
69. Cf. HAMBERG 1936, 32-38.
70. GODŁOWSKI, 1992a, 84.
71. KEMPISTY 1968.
72. KONTNY 2002b, 116.
73. In practice these were almost entirely spurs, and only sporadically fragments of bits.
74. OKULICZ 1970, 426.
75. Gródki, Płośnica commune, Płońsk district, warmińsko-mazurskie voivodeship, graves 1, 39, 41: OKULICZ 1983; Niedanowo, Kozłowo commune, Nidzica district, mazowieckie voivodeship, graves 247, 275: ZIEMLIŃSKA–ODOJOWA 1999; among sites outside the Nidzica Group, Modła, Wiśniewo commune, Mława district, mazowieckie voivodeship, graves 31, 10/84: GRZYMKOWSKI 1986; Stupsk, *loco* commune, Mława district, mazowieckie voivodeship, grave 10/91: GRZYMKOWSKI 1996, 177.
76. The reason for this phenomenon may be the fact that the assemblages broadly dated to phase B_2 were not taken into account for the number of assemblages with spurs is too small for that period to change the results significantly (5 cases out of 64). As among the assemblages dated broadly phase B_2 and phases B_1-B_{2a} spurs are quite rare, the frequency for the phases B_1 and B_{2a} was in fact probably slightly lower.
77. This observation is reliable as among the burials dated to phases B_{2b}-C_{1a} and B_2/C_1-C_{1a} a similar proportion contained spurs (16 burials - 28,1% and 6 burials - 33,3%, respectively).
78. GINALSKI 1991, 74.
79. Cf. M. Biborski's findings on the evolution of sword forms in the Przeworsk Culture (BIBORSKI 1978, 104-105).
80. GODŁOWSKI 1992a, 84-85; ENGSTRÖM 1992, 59.
81. GODŁOWSKI 1992a, 85.
82. It is assumed that with respect to riding equipment they are in many respects a better source of knowledge about weapons than the grave goods: ILKJÆR 1997, 57-58; von CARNAP–BORNHEIM 1992, 46-47; n. 6; von CARNAP–BORNHEIM 2000, 52.
83. This is indicated by the finds from the Ejsbol Nord Deposit (dated to phase C_2), where among the ritually deposited weapons belonging to ca 200 warriors, nine pairs of spurs, nine horse trappings with chain reins, and fittings for nine saddles were discovered: ØRSNES 1988, 24. Although at Skedemosse (Oland), fragments of more than a dozen horse trappings not matching the spurs were found: HAGBERG 1967, 33, 73-75, and a small deposit from Kragehul did not yield any elements of riding equipment: ENGELHARDT 1867, table II, at Vimose 24 spurs (including ones dated to the Younger and Late Roman Period) together with fragments of a bit were unearthed: ENGELHARDT 1869, 24-25, pl. 15:7-16 and at Nydam one spur and pricks of over a dozen other ones as well as numerous bits were found: ENGELHARDT 1865, 33-34, pl. XIV:5; BEMMANN–BEMANN 1998a, 196-198; BEMMANN–BEMMANN 1998b, pl. 212, whereas at Thorsberg one spur (its remaining part was made of bronze and the iron spike has not been preserved; probably more iron spurs were deposited at the site which were not preserved due to unfavourable environment) and fittings of horse trappings were discovered: ENGELHARDT 1863, 52-53, pl. 15:32; ENGELHARDT 1866, 61; RADDATZ 1987, pl. 39-47, 100-106.
84. W. Adler considers the possibility of using javelins by Germanic riders: ADLER 1993, 244-245. Contrary to the information by Tacitus quoted above (*Germ.* 6, 1) that the foot warriors used the javelins, which was to distinguish them from the riders, he assumes that the mounted warriors probably used javelins in combat. As a confirmation of his claim he quotes the information from Arrian's work *Ars Tactica* (Tact. 40, 9-11). This work was commissioned by Emperor Hadrian and served as a manual of military skills: HYLAND 1993, 3. It concerned, however, the Roman reality and certainly can not be automatically referred to the world of Germans. It is more justified to refer various pieces of Arrian's information (but not this one) to the Sarmatian peoples: Arrian, who took part in the wars with the Alans used their methods of horseback combat: HYLAND 1993, 5. It is thus

more reasonable to follow the views of Tacitus and agree that in the period about which he wrote the Germanic warriors did not use javelins in horseback combat.

85. See DIXON–SOUTHERN 1992, 51; BISHOP–COULSTON 1993, 69; JUNKELMANN 1998, 140-141.
86. On this and alternative ways of fixing spears see HYLAND 1993, 146.
87. HYLAND 1993, 151, 163, 171-173.
88. See PERL 1990, 151; POHL 1994a, 62.
89. The retinue is usually defined on the basis of Tacitus' writings (Tac., *Germ*. 13, 2-3; 14, 1-3) as a voluntary, sworn union of warriors (free men) and the leader, where the warriors are obliged to give advice and provide military service to the chief, and he should in return give them protection and generosity. The more detailed aspect of how the retinue functioned are subject to debate. For the definition and kinds of German retinues see cf. SCHLESINGER 1953, 235; KUHN 1956, 12; WENSKUS 1961, 346-374; HESS 1977; STEUER 1982, 54-56; KRISTENSEN 1983; BAZELMANS 1991; von CARNAP–BORNHEIM 1992; WOLFRAM 1996, 70-73. On Celtic retinues: BIRKHAN 1993, 1037-1049. Prospects of tracing the retinue basing on the archaeological material are rather poor: KONTNY 2003a.
90. See n. 96.
91. For collaboration of Germanic foot warriors and riders cf. Tacitus, *Germ*. 6, 3 (see n. 92). Similar information concerning Germans is given by Julius Caesar - Caes., *Bell. Gall*. I, 48, 5-7: "There were 6,000 horse, and as many very active and courageous foot, one of whom each of the horse selected out of the whole army for his own protection. By these [foot] they were constantly accompanied in their engagements; to these the horse retired; these on any emergency rushed forward; if any one, upon receiving a very severe wound, had fallen from his horse, they stood around him: if it was necessary to advance further than usual, or to retreat more rapidly, so great, from practice, was their swiftness, that, supported by the manes of the horses, they could keep pace with their speed."; "*equitum milia erant VI, totidem numero pedites velocissimi ac fortissimi, quos ex omni copia singuli singulos suae salutis causa delegerant: cum his in proeliis versabantur, ad eos se equites recipiebant; hi, si quid erat durius, concurrebant, si qui graviore vulnere accepto equo deciderat, circumsistebant; si quo erat longius prodeundum aut celerius recipiendum, tanta erat horum exercitatione celeritas ut iubis sublevati equorum cursum adaequarent*".
92. Tac., *Germ*. 6, 3: "On the whole, one would say that their chief strength is in their infantry, which fights along with the cavalry; admirably adapted to the action of the latter is the swiftness of certain foot-soldiers, who are picked from the entire youth of their country, and stationed in front of the line"; "*In universum aestimanti plus penes peditem roboris; eoque mixti proeliantur, apta et congruente ad equestrem pugnam velocitate peditum, quos ex omni iuventute delectos ante aciem locan*t".
93. Tac., *Germ*. 14, 2: "Indeed, men look to the liberality of their chief for their war-horse and their bloodstained and victorious *frame*a"; "*exigunt enim principis sui liberalitate illum bellatorem equum, illam cruentam victricemque frameam*".
94. See KRISTENSEN 1983, 44, 50.
95. According to Ammianus Marcellinus (Amm., 16, 12, 34), at a certain moment among the masses of foot German warriors there were heard voices calling the few riders belonging to the tribal aristocracy (the king's sons) to dismount, for it was feared that if the Romans were to start winning, they would use their horses to escape from the battlefield. Obeying these voices they dismounted and fought on foot: POHL 1994b, 164. This indicates that the horse was treated mainly as a means of transport to the battlefield (evacuation from the battlefield, chasing the defeated enemy) and a sign of the warrior's high rank, and not as a tool used extensively in the battle.
96. The Venethi are described by Tacitus (the Roman historian was not certain whether they should be counted as Germans): in their plundering forays they covered large distances on foot and they differed from the Sarmatians in their fondness for walking and speed (Tac., *Germ*. 46, 2). This description may be interpreted as a confirmation that pillaging attacks organised without the use of horses were also effective.
97. At the column representations a clear domination of Germanic foot warriors over the equestrians can be seen despite the fact that the presented warriors are generally identified on the basis of their garments as members of the elite warrior group (*nobiles*), who could probably afford to keep a horse: cf. SCHYMALLA 1987, 50.
98. Illerup Place A: 5-7 warriors of highest rank with silver shield fittings, swords richly decorated according to local demands, horses, and other military equipment; more than 30 warriors of medium rank with bronze shield fittings, swords and shields with Roman bronze fittings etc.; almost 300 warriors of lower rank with iron shield fittings and pairs of shafted weapon heads: ILKJÆR 1997, 56-61; cf. ILKJÆR 1994b, table 1. Ejsbøl Nord: 12-14 "officers," at least nine of whom on horseback, at least 60 middle rank warriors with swords and one hundred and several ten warriors of the lowest rank: ØRSNES 1988, 25; cf. BEMMANN–BEMMANN 1998a, 357-359.
99. SHETELIG 1930; RIECK 2003.
100. Cf. CRUMLIN–PEDERSEN 1987, 101, 103.
101. von CARNAP–BORNHEIM 1997.
102. CRUMLIN–PEDERSEN 1987, 103.
103. KONTNY 2002b, graph 1-2; KONTNY 2003c: graph 3-7.

104. KONTNY 1998.
105. KONTNY 2002a.
106. BIBORSKI 1978, 128-129; GODŁOWSKI 1992a, 78, 80. The latest known find from Grudynia Mała, Pawłowiczki commune, district Kędzierzyn-Koźle, opolskie voivodeship: JAHN 1919, 102-103, pl. X-XI, formerly dated to phase C_{1a}, actually came from an unclear context – probably the furnishings of two or even three graves were mixed: KONTNY 2003b.
107. The decline of one-edged swords may be explained, after P. Kaczanowski, with a large 'supply' of high-quality Roman swords, which superseded the less efficient weapons. This phenomenon appeared from phase B_{2b} (KACZANOWSKI 1992, 70).
108. Cf. KONTNY 2002a.
109. The above results may be in reality lower by a few per cent because swords were rare in imprecisely dated burials. It is difficult to asses unequivocally which of the phases would have a lower frequency of swords; this may concern phases B_{2a}-B_2/C_1, because this broader period has yielded a large number of imprecisely dated burials: KONTNY 2002b: table 1; KONTNY 2003c: table 1.
110. KONTNY 1998.
111. BIBORSKI 1978.
112. It seems that due to their considerable length they may have successfully served as slashing weapons.
113. BIBORSKI 1978, 61-62, 64, 69, 71, 78, 86, 90, 92, 94-107; GODŁOWSKI 1992a, 76-85.
114. GODŁOWSKI 1992a, 80.
115. Due to the multiplicity and variety of battle scenes the reliefs of the column of Marcus Aurelius are a better comparative source for the assessment of Germanic weapon sets than the representations from the Portonaccio Sarcophagus.
116. SCHYMALLA 1987, 31-49; cf. CAPRINO et al., 1955.
117. Cf. ILKJÆR 1994b, table 1; ILKJÆR 1997, 56-61; ØRSNES, 1988, 25.
118. They were represented by shield bosses quite often accompanied by shield grips, and sporadically by other kinds of fittings.
119. If a sample is small even non-numerous phenomena may become statistically valid.
120. KONTNY 2002a, fig. 4.
121. JAHN 1916.
122. JAHN 1916, 176; GODŁOWSKI 1977, 70; KACZANOWSKI 1992, 70; KOKOWSKI 1994, 373; SCHULTZE 1994, 365.
123. Among the 19 burials generally dated to the Younger and Late Roman Period, 9 contained fragments of shield fittings as the only element of military equipment. As a result burials with metal shield fittings were more numerous in phase C_1, that it is shown in diagram. The possible 'growth' of frequency may amount to as much as 10%.
124. KONTNY 2003c, table 3.
125. The suitability of shields of this type has been discussed elsewhere: KONTNY 2002a, 62-63. Therefore I only note that thanks to their flexibility they broke the blows of the opponent's weapon very well and they were also light which made their use in the battle easier. Moreover, they were less expensive to make than shields with fittings and easier to repair.
126. KAUL 2003, 175.
127. These data are only an estimate because many shields have been preserved fragmentarily and it was impossible to assign all the fragments to particular shields.
128. ROSENBERG 1937, 106-109, Fig. 26-30; KAUL 2003, 152-153.
129. DOMARADZKI 1977, 68-69, with further literature; RITCHIE – RITCHIE 1996, 48-51.
130. RAFTERY 1989, 121-122, Fig. 8:6; CUNLIFFE 2003, 121, Fig. 50.
131. ENGELHARDT 1866, 50; ENGELHARDT 1869, pl. 5: 4, 9.
132. One should mention also one more specimen from Vimose: a rectangular object consisting of two planks. ENGELHARDT 1869, pl. 5: 20. It was interpreted as a complete shield made of organic materials: CAPELLE 1982, 272; cf. ZIELING 1989, n. 734. Actually, according to Xenia Pauli Jensen, preparing her Ph. D. on the topic of Vimose, we are dealilng with a fragment of a circular shield. I'd like to express here my gratitude for that oral information.
133. According to C. Engelhardt it was the internal lining of the shield boss: ENGELHARDT 1866, 50.
134. ENGELHARDT 1866, 50; ENGELHARDT 1863, pl. 8:15.
135. Tacitus, *Annales* II, 14: "(...) *ne scuta quidem ferro nervove firmata, sed viminum textus vel tenuis et fucatas colore tabulas*".
136. CAPRINO et al., 1955, pl. M.
137. One may imagine also different techniques of offensive use of a shield, provided i.a. by Ancient written sources. An excellent illustration is depicted by Q. Claudius Quadrigarius (ca 100 BC) who presented a duel of the Roman commander, Titus Manlius with a Celtic warrior. This took place during the battle at Anienum (360 BC). The Roman hit the Gaul's shield with his own, shook him and then hit his opponent's, who tried to regain his balance, shield again. The Gaul swayed, lifted his shield, uncovering his body and Manlius buried his short sword in his breast. The fragment of Quadrigarius' description was recorded (9.13) in the 2nd century AD: PLEINER 1993, 29. Such a method is confirmed also in other cultures, e.g., Ancient Greece: OAKESHOTT 1960, 63-64 or the African Zulu tribe during the Shaka reign: MORRIS 1966, 38, 47.
138. In the eyes of Romans vast majority of Germanic warriors used the shield, which is indicated, e.g., by the representations of German warriors on the column of Marcus Aurelius: cf.

SCHYMALLA 1987, 49-50.

139. JAHN 1916.
140. Tac., *Iulii Agricolae Vita* 36.
141. RESI 1986, 70-72, pl. 8-9.
142. STIMMING 1912, 310, pl. 45.
143. ILKJÆR 2001, 356-358, fig. 319.
144. ANDRZEJOWSKI 2000.
145. KONTNY 2006, 207.
146. E.g., JAHN 1916, 176; GODŁOWSKI 1977, 70; KACZANOWSKI 1992, 70.
147. KONTNY 2006, 205-208.
148. von CARNAP-BORNHEIM–ILKJÆR 1996, *passim*; ILKJÆR 1997, 56-61.
149. ILKJÆR–JOUTTIJÄRVI–ANDRESEN 1994; von CARNAP-BORNHEIM–ILKJÆR 1996, 384.
150. von CARNAP-BORNHEIM 1992; von CARNAP-BORNHEIM, 2000.
151. KONTNY 2006, 207.
152. RADDATZ 1966, 440.
153. KONTNY 2002b, graph 1-2; KONTNY 2003c: graph 3-7.
154. GEBÜHR 1980, 78-80; ADLER 1993, 157; GUNDELWEIN 1994.
155. Incisions on weapons were most probably traces of their ritual destruction which is supported by the regularities of the cuts, their location, i.a., in the places where they could not have been damaged by the enemy weapons during combat, the depth of the cuts, suggesting that the weapon was held fast and the fact that not only elements of military equipment were destroyed. See M. Biborski's discussion of M. Gebühr's views: BIBORSKI 1981, 55-61. A detailed analysis of traces and origins of damage done to various kinds of weapons from the bog site at Nydam was conducted by G. and J. Bemmann: BEMMANN–BEMMANN 1998a, 312-317; for the swords see also: SIM 1998, 383.
156. In burials dated generally to phase B_2 the arrowheads appeared more often than it would be indicated by the frequencies presented in Diagram 13 for all the phases (7 out of 64 burials (10.9%). It is not known to which phases these cases should be assigned, but whatever the attribution is it would not change the result obtained for phase B_{2b} (due to the large number of burials from that phase) and for phase B_{2a} the proportion of heads would increase by a few per cent.
157. GODŁOWSKI 1992a, 81.
158. GODŁOWSKI 1992a, 85.
159. Among the burials imprecisely dated to the Younger and Late Roman Period or its greater part the proportion of burials with arrowheads is greater than it is indicated by the diagram, although it is difficult to assess for which of the time intervals the change would be the greatest (arrowheads were found, e.g., in 5 burials out of the 56 dated to phases B_{2b}-C_{1a}, 2 out of the 3 burials dated from phase C_{1b} to the end of the analysed period, 3 from the 11 burials dated to phases B_2/C_1-C_1). The higher frequency might have characterised rather the end of the discussed period, which is indicated by the distribution of frequencies among the burials with more precise chronology. Due to the small numbers of broadly dated features, the changes could not exceed a few per cent (amounting to below 5%).
160. GODŁOWSKI 1977, 67.
161. ENGSTRÖM 1992, 60, fig. 14; cf. RADDATZ 1967, 9.
162. RADDATZ 1963; BECKHOFF 1963.
163. PAULSEN 1998.
164. PAULSEN 1998, 391, Fig. 3.
165. PAULSEN 1998, 390-391.
166. Analogous to the finds from the Przeworsk Culture burials.
167. PAULSEN 1998, 408, 421.
168. BECKHOFF 1963, 47; PAULSEN 1998, 422.
169. PAULSEN 1998, 423-424.
170. PAULSEN 1998, 391, 405, 423, 425.
171. It may seem that K. Raddatz also shared doubts about the functions of bows from the Roman period. He expressed them in his monograph on the arrowheads from Nydam: RADDATZ 1963, 49, 54; although in another paper he opted for their military designation: RADDATZ 1967, 9.
172. RADDATZ 1967, 9.
173. KACZANOWSKI 1992, 75.
174. KIEFERLING 1994, 336, 355-356, Fig. 1.
175. RADDATZ 1967, 9, 13.
176. DOMAŃSKI 1973, 137-143; ADLER 1993, 31-33.
177. KOSTRZEWSKI 1959, 147; KOSTRZEWSKI 1964, 105. On the doubts as to the actual role of battle axes in that period see also RADDATZ 1967, 13.
178. HYLAND 1993, 172-173.
179. One should mention that phases B_{2b} and B_2/C_1 are characterized by a clear standardization of weapon sets found in graves and growth of frequency of weapon graves. It may be interpreted as a proof of militarization of the Przeworsk Culture population as well as general improvement of economy. It correlates well with the growing flow of Roman swords into the territory of the Przeworsk Culture as well as sudden growth of iron production (e.g., Holy Cross Mountains centre, and probably also West Mazovian centre). It presumably may be connected with the warlike tendencies among barbarians distant from Roman limes preceding the Marcomannic Wars and the eventual entanglement of the Przeworsk Culture population or part of it in the military accidents of years 166-180 AD: cf. KONTNY 2005, with further literature.
180. PERL 1990, 151; POHL 1994a, 62.

181. Tac., *Germ*. 6, 4: "*Acies per cuneos componitur*".

182. Tac., *Germ*. 14, 1: "And what most stimulates their courage is, that their squadrons or battalions, instead of being formed by chance or by a fortuitous gathering, are composed of families and clans"; "*Cum ventum in aciem, turpe principi virtute vinci, turpe comitatui virtutem principis non adaequare*".

183. Tac., *Germ*. 7, 2: "*quodque praecipuum fortitudinis incitamentum est, non casus, nec fortuita conglobatio turmam aut cuneum facit, sed familiae et propinquitates*".

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