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THE SARISSA

INTRODUCTION

Recent years have seen renewed interest in Philip and Alexander, not least in the sphere of military affairs. The most complete discussion of the *sarissa*, or pike, the standard weapon of Macedonian footsoldiers from the reign of Philip onwards, is that of Lammert. Lammert collects the ancient literary evidence and there is little one can disagree with in his discussion of the nature and use of the *sarissa*. The ancient texts, however, concentrate on the most remarkable feature of the weapon – its great length. Unfortunately several details of the weapon remain unclear. More recent discussions of the weapon have tried to resolve these problems, but I find myself unable to agree with many of the solutions proposed. The purpose of this article is to suggest some alternative possibilities using further ancient literary evidence and also comparisons with pikes used in other periods of history. I do not intend to cover those aspects of the *sarissa* already dealt with satisfactorily by Lammert and his predecessors¹.

THE PIKE-HEAD

Although the length of the pike is the most striking feature of the weapon, it is not the sole distinguishing characteristic. What also distinguishes a pike from a common spear is the nature of the head. Most spears have a relatively broad head designed to open a wide flesh wound and to sever blood vessels. They are usually used to strike at the unprotected parts of an opponent's body. The pike, on the other hand, is designed to penetrate body defences such as shields or armour. This important feature is recorded in several passages in ancient literature.

¹ A.-J. Reinach, *Sarissa*, Dar.-Sag. sv; Lammert, *Sarisse* PW sv.

Diodorus (17. 84. 4) preserves a contemporary description of an incident during the early stages of Alexander's campaign in India, where the Macedonian phalanx is ordered to exterminate a body of Indian mercenaries who were withdrawing under the terms of a truce just made. He records that "pushing through the *peltai* (shields) of the barbarians with their *sarissai* the Macedonians pressed the iron heads into their lungs".

(οἱ γὰρ Μακεδόνες ταῖς σαρίσαις ἀναρρήσσοντες τὰς τῶν βαρβάρων πέλτας τὰς ἀκμὰς τοῦ σιδήρου τοῖς πνεύμοσιν ἐνήρειδον) Interestingly, this passage is very specific about the metal used for the pike-head: iron. Similarly Plutarch (Vit. Aem. Paul. 20. 2), who probably based his description of the battle on the eyewitness account of Scipio Nasica, tells us that at the battle of Pydna the Romans were skewered on the Macedonian pikes, armour and all, 'for neither shield nor cuirass could resist the force of the *sarissa*:

(οὔτε θυρεοῦ στέγοντος οὔτε θώρακος τὴν βίαν τῆς σαρίσης).

It has been found that a small spear-head is capable of piercing body defences more effectively than a broad head, which dissipates the penetrative power over a larger surface area. During the great age of the pike in early Modern European warfare (late 15th to mid-17th centuries) pike heads were typically small. Claude Blair defines the pike as follows².

A term applied loosely to any sharply-pointed spear... It is, however, used especially to denote the very long, small-headed spear... with a small leaf- or lozenge-shaped head.

Exceptions do occur, but in general small, narrow pike-heads have been more successful than large, wide ones. A few examples from the early Modern period illustrate this point.

At the Battle of Benburb in 1646, fought during the Irish Wars, it was found that the Irish pikes were more effective than the Scottish, because the Irish pikes were longer and more penetrative. The Irish pike-heads seem to have been of a bodkin shape, square in section. An anonymous "British Officer" of Clotworthy's regiment on the Protestant side left an account of the battle, in which he informs us that³

The Irish pikes were longer by a foot or two than the Scottish pikes, and far better to pierce, being four square and small, and the other pikes broad headed, which are the worst in the world.

² C. Blair, *European & American Arms c. 1100-1850*, New York 1962, p. 29.

³ *The History of the Warre of Ireland, from 1641 to 1653, by a British Officer of the Regiment of Sir John Clotworthy*, [ed. 1873], p. 49, quoted in R. Bagnell, *Ireland under the Stuarts*, London 1909, Vol. II, p. 120-121.

The same source tells us that Lord Orrery, who served in the same Irish Wars, thought lozenge-shaped pike-heads to be the best

because they are sharp to enter, and when entered broad to wound with.

A small anonymous treatise entitled *The English Military Discipline* (published 1680) reports⁴.

All pikes now a dayes are of the same length, made of strong ash, and very straight, about fourteen or fifteen foot long between the head and foot. The head is four inches long, and two and a half broad at the largest place.

It is clear that small lozenge-shaped pike-heads were preferred. Eventually they became the norm, but, it should be noted, their use was never universal, and other shapes did occur, especially at the beginning of the great age of the pike, before pike forces had accumulated experience. Thus the early Swiss pike had a ten-inch (25 cm) steel head upon an eighteen-foot haft (5.5m) of ash⁵.

Returning to the ancient evidence, we will first examine a piece of literary evidence which has not, to my knowledge, been brought into the argument before. In his manual on hunting the Augustan poet Grattius (*Cynegeticon* 117–120) recommends that the prospective hunter selects a well-balanced spear and continues:

*quid, Macetum immensos libeat si dicere contos?
quam longa exigui spicant hastilia dentes!
aut contra ut tenero dstrictas cortice virgas
praegravat ingenti pernix Lucania cultro!*

What if I allow myself to speak of the immense *contoi* of the Macedonians?
How long are the shafts and how mean the teeth they spike them with!
Or, on the other hand, how on slender twigs stripped of their tender bark
does agile Lucania overload (their shafts) with a huge cleaver (ie. spear-head)!

Grattius uses the word *contos*, more familiar in his time as the name given to the immense Parthian cavalry-spear in preference to the longer word *sarissa*: there can be little doubt, however, that he is talking of the Macedonian *sarissa* but has exchanged the word for reasons of metre. In fact in other texts of an Imperial date the word *contos* is certainly used of an infantryman's pike⁶. The word *exiguus* (mean, scanty, small, little,

⁴ In F. Grose, *Military Antiquities Respecting a History of the English Army from the Conquest to the Present Time*, revised edition, London 1801, Vol. II, p. 278.

⁵ E. Oakeshott, *European Weapons and Armour, From the Renaissance to the Industrial Revolution*, 1980 p. 57.

⁶ Eg. Arrian, *Expeditio contra Alanos*, 16, probably also in Lucian, Alex. 55.

inadequate) used to describe the spear-heads of these Macedonian pikes leaves no doubt as to their small size.

The contrast with Lucanian spears, well-known from the red-figure vases of South Italy, is most striking. These spears have very slender and quite short shafts, hence Grattius describes them as "twigs", and really quite huge heads, which Grattius describes as "cleavers" (Fig. 1).

No excavated examples of spear-heads can be identified with certainty as *sarissai*. The long spear-heads recovered from the grave mound at Chaironeia, tentatively identified as the battlefield grave of the Macedonians by the excavator, measured 38 cms.⁷ The identification of the grave is uncertain, and the spear-heads, from their very great length, are unlikely to have belonged to *sarissai*.

Few representations of spear-heads which can be identified as *sarissa*-heads with any certainty have survived. The best candidate is the stand of pikes shown behind the figure of Darius on the Alexander Mosaic from the Casa del Fauno in Pompeii (Fig. 2). It has been generally accepted that these pikes are *sarissai* carried by the advancing Macedonian phalanx⁸. The spear-heads are shown in white, representing iron. Any estimation of their size is marred by the indistinct use of perspective by the artist, but the heads are fairly small. If the spears were shown to the same scale as Darius' hand they would be about 10 to 15 cm long. There are minor differences between the various heads shown; differences in shape are probably due to differences in the angle from which the pike-heads are being viewed. The heads take the form of an elongated diamond set into a fairly long socket taking up more than a third of the total length of the head. The wooden spear-shafts taper noticeably towards the tip, a feature one would expect on a pike of this type. In the early modern period the shafts of pikes tapered at the tip and at the butt, most probably in order to reduce weight and to increase handling by keeping the centre of gravity of the pike towards the middle portion of the shaft which was the part the pikeman actually held. The thinness of the shaft towards the tip would, however, constitute a point of weakness in the *sarissa*. Another interesting feature are the two black bands shown on the sockets of most of these spear-heads, most visible on the spear-head shown above the head of Darius, of

⁷ The principal article is G. Sotiriades, *Das Schlachtfeld von Charonea und der Grabhugel der Macedonen*, Ath. Mitt. 1903, No. 28, p. 301-330; a full list of references is given by W. Kendrick Pritchett in *AJA* 1958, No. 62, p. 308 nt. 19.

⁸ One work dealing with this question is that of C. Nylander, *The Standard of the Great King* "Opuscula Romana XIV", 1983, Vol. XIV, p. 19-37. In this otherwise excellent article Nylander unfortunately rejects the traditional interpretation on account of the recent, in my view incorrect, work on the *sarissa*.

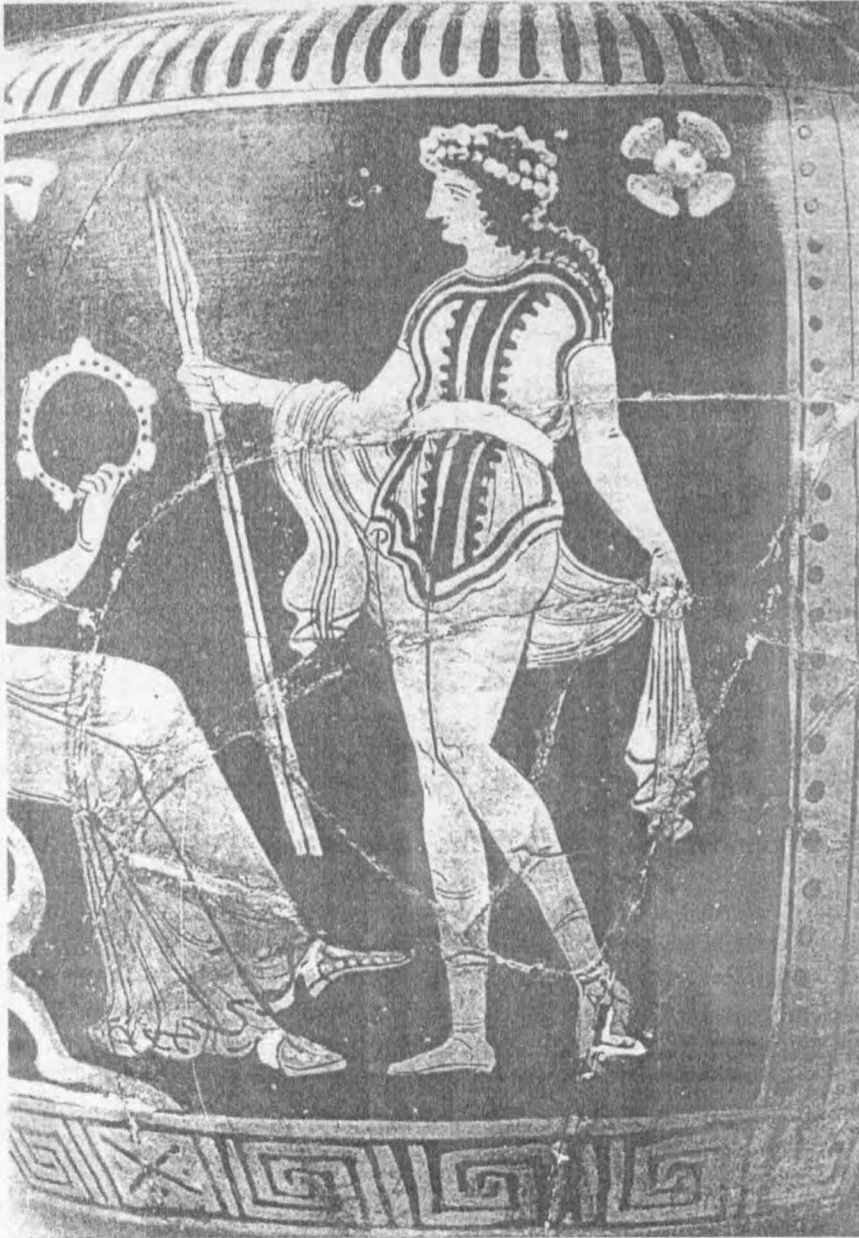


Fig. 1. A South Italian warrior holding a Lucanian spear. Grattius contrasts their large heads and short shafts with the Macedonian *sarissa* (After. *Corpus Vasorum Antiquorum*, Pologne fasc. 7 = Varsovie, Musée National 4, 1967, pl. 23, 3)

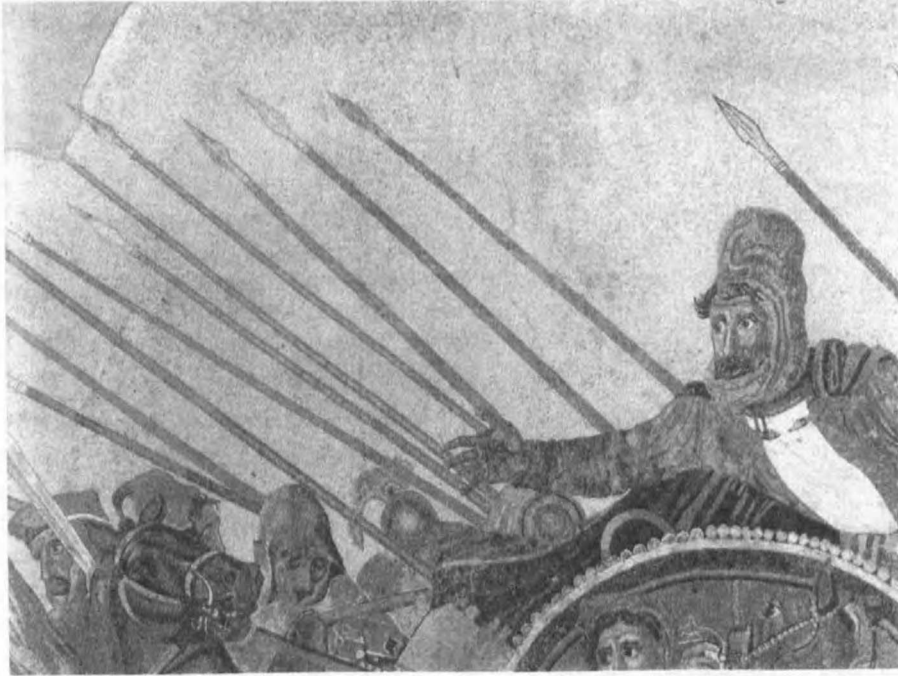


Fig. 2. A stand of Macedonian *sarissai* shown behind Darius on the Alexander Mosaic (Photo: German Archaeological Institute Rome, Neg. 59.756)

which more later. So the spear-heads shown in the Alexander Mosaic, in all probability *sarissa*-heads, are small in size, and of a narrow diamond shape.

In sum, comparisons with later European practice, the single piece of literary evidence we have available, and the only example of representational evidence we can identify with any certainty, all indicate that the *sarissa* typically had a small head with a narrow diamond or lozenge shape. Bearing these points in mind we may now turn to examine the attempts which have been made by archaeologists to identify spear-heads recovered from excavations as belonging to *sarissai*.

Robinson sought to identify the many small iron spear-heads found in excavations at Olynthus as *sarissa*-heads. The heads are very small indeed. The example illustrated in Figure 3, the most complete example of the type, is only 13.5 cm in length. These spear-heads belong to Robinson's Group AII. Some examples from Group A are of Archaic date, but, Robinson argues, "As this type has been frequently found in Macedonia and seems to be represented on the Alexander-mosaic we are perhaps justified in considering such spearheads as tips of Macedonian *sarissae*".

This identification was tentatively accepted by Snodgrass⁹. I am personally not completely sure whether the Robinson's identification of these spear-heads should stand or not. They seem to be approximately the same shape as those shown on the Alexander Mosaic, but their sockets are extremely narrow, seemingly measuring 1.5 cm at most. If the ends of the shafts were extremely tapered the identification might stand, but the possibility exists that Robinson's type AII heads may have been used to tip javelins.

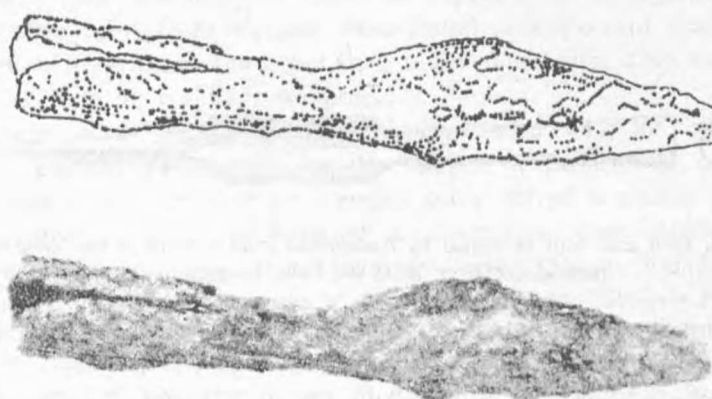


Fig. 3. Spear head of Robinson's Group All from Olynthus no. 2146

More recently Andronicos identified a large, leaf-shaped, bronze spear-head, found in in the Vergina cemetery in Macedonia (Fig. 4), as a *sarissa*-head, mainly on the basis of its size – on the mistaken assumption that a large spear should be tipped with a large spear-head¹⁰. The spear-head is truly enormous, measuring more than half a metre in length and weighing about one and a quarter kilogrammes. His identification was generally accepted and generated a considerable amount of experimental archaeology¹¹. The identification is now so widely accepted and appears so ubiquitously in the literature that it would be impossible to even begin to cite references.

⁹ D. M. Robinson, *Excavations at Olynthus, Part X, Metal and Minor Miscellaneous Finds*, Baltimore 1941, p. 412-413, pl. CXXVII; A. M. Snodgrass, *Arms and Armour of the Greeks*, London 1967, p. 119.

¹⁰ M. Andronicos, *Sarissa*, BCH 1970, No. 94, p. 91-107.

¹¹ M. M. Markle III, *The Macedonian Sarissa, Spear, and Related Armour*, AJA 1977, No. 81, p. 323-339; M. M. Markle III, *Use of the Sarissa by Philip and Alexander of Macedon*, AJA 1978, No. 83, p. 483-497; M. M. Markle III, *Macedonian Arms and Tactics under Alexander the Great*, „Studies in the History of Art“ 1980, No. 10; *Symposium Series I*, p. 87-111.

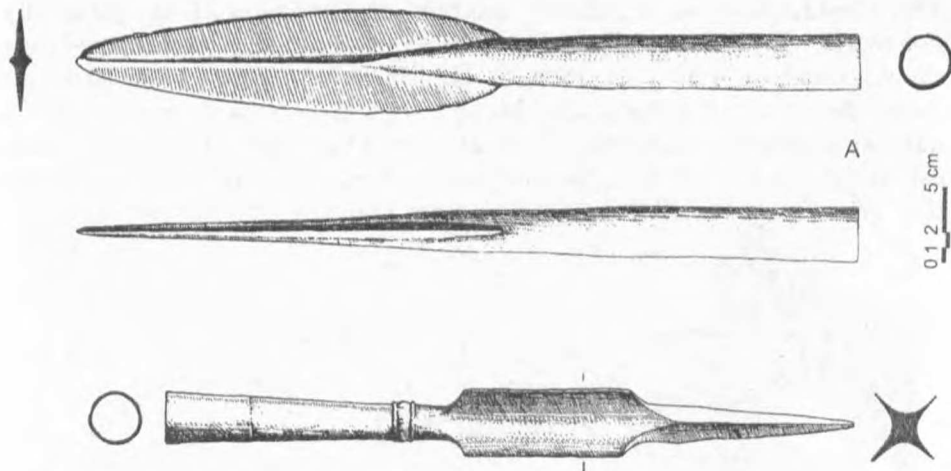


Fig. 4. Spear-head and -butt excavated by Andronicos from a tomb in the Vergina Cemetery (reproduced from BCH 94, 1970, by permission)

As a result many spear-heads measuring about half a metre in length, mainly from cemeteries in Macedonia (some with leaf-shaped blades like Andronicos' example but others with much narrower blades) have been identified as *sarissai* in the archaeological literature¹². Needless to say, I do not consider these to be *sarissa*-heads. Perhaps, more importantly, we seem to be dealing with two distinct groups of archaeological material. Firstly we have the "Andronicos" type. The paradigm example excavated by Andronicos is bronze, 51 cm long and weighs 1.235 kg. The butt is of a distinctive type consisting of a socket-tube, quadruple flange and talon. It is 44.5 cm long and weighs 1.070 kg.

A spearhead of the same wide leaf-shape, but measuring 45 cm and made of iron, was found inside the main chamber of Tomb II at Vergina¹³. Another example of the "Andronicos" type of butt has been recovered from Isthmia¹⁴. The Isthmia example is practically identical to the "Andronicos" butt, except that the flanged section of the butt is slightly longer. This minor difference could be due to some slight difference in date, though

¹² M. M. Markle III, *Weapons from the Cemetery at Vergina and Alexander's Army*, Megas Alexandros, 1980, p. 243-267.

¹³ The spear-head from Philip's Tomb is mentioned by Markle in *Macedonia and Greece in Late Classical and Early Hellenistic Times*, ed. B. Barr-Sharrar, E. N. Borza, Washington 1982, p. 88-89 and is illustrated in *The Search for Alexander: An Exhibition*, 1980, p. 186, nos. 167.

¹⁴ *Hesperia* 49 (1980) pl. 108 d. I would like to thank Dr. A. H. Jackson for drawing my attention to this example.

there seems to be no pressing reason to doubt that all the pieces of this type come from around the period of Philip and Alexander.

The huge size and weight of the Andronicos spear-head, as well as the fact that it is made of bronze rather than iron, seem to rule it out as a practical weapon for use in war. The peculiar shape of the spear-butt indicates that it may have had a special purpose. The aim of the quadruple flange above the talon seems to have been to ensure that the spear remained rigid when planted in the ground. These features suggest that the Andronicos spear was designed more for display than for fighting. The fact that both weapons from Vergina were found in important tombs, in one case even a royal tomb the other in a major sanctuary, also suggests that the spears were no ordinary weapons.

In more recent times ornamental heavy-bladed weapons, such as halberds or glaives, have served as the badges of officers or of corps of guards, and it may be that the Vergina spear served a similar purpose in a Macedonian context, perhaps as a distinctive spear carried by the "Bodyguards" (*somatophylakes*). There were seven "Royal Bodyguards", the most senior rank in Alexander's Army, and each "Royal Bodyguard" commanded a troop of "Bodyguards"¹⁵. One of the "Royal Bodyguards", Amyntas, was once brought to trial by Alexander. In the account of his trial preserved in Curtius (7. 1. 18) we are told that during the trial Amyntas desired to be given the attire of a Bodyguard and Alexander ordered that he should be given a lance (*desiderantique Amyntae, ut habitus quoque redderentur armigeri, lanceam dari iussit*). Is it possible, then, that the Vergina spear could be a distinctive type of spear carried by such "Bodyguards"?

Spears were used to signal orders in battle, and it is possible that special spears became the badges of those officers who were entitled to give or relay those messages. Diodorus (15. 52. 5) tells us that before the Battle of Leuctra the secretary (*grammateus*) to the board of generals was signalling the orders from headquarters to the army when a wind came up and tore the ribbon (*tainia*) from the spear. Thus the spear of this officer was marked in a special way, with a ribbon. Ornamental Roman spearheads have been found which were presumably carried as rank insignia by *beneficarii* or others while engaged in special administrative, supply or policing duties¹⁶. In a later period Hunnic officers carried gold-plated bows,

¹⁵ N. G. L. Hammond, G. T. Griffith, *A History of Macedonian. Volume II 550-336 B.C.*, 1979, p. 403, 409; N. Sekunda, A. McBride, *The Army of Alexander the Great*, 1984, p. 9-10.

¹⁶ M. C. Bishop, J. C. N. Coulston, *Roman Military Equipment from the Punic Wars to the Fall of Rome*, 1993, p. 124, fig. 84, 13, 14; p. 126 n. 13.

quite useless as weapons of war, as badges of rank¹⁷. Bearing these comparisons in mind, it may be wiser to consider the Andronicos spear as a badge of rank or office rather than a practical weapon of war.

A further class of weapons from Macedonian tombs and cemeteries have also been identified in the literature as *sarissai*. They seem to be of yet another separate type. All examples of this weapon are iron. The longest of them, also found in Tomb II at Vergina, exceeds the "Andronicos" spear-head in length, at 55.3 cm, and is likewise leaf-shaped, but not nearly as wide. In fact it is exceedingly narrow¹⁸. Of the examples discovered in the cemeteries at Vergina, the largest weighs just 0.530 kg, less than half the weight of the "Andronicos" spearhead¹⁹. A further example of this type, also one of the six examples discovered in the southwest area of the main chamber of Tomb II ("Philip's Tomb") at Verghina, was found stuck to the wall of the tomb by its corrosion, its wooden shaft having rotted and completely disappeared. The total height of the main chamber is 5.30 m and from its position about half-way up the wall we can calculate that the original length of the spear would have been under 3 m – far too short to have belonged to a *sarissa*²⁰. In fact it is similar in both shape and length to the hunting spears shown being used by hunters in the Hunt scene in the frieze of the tomb's facade²¹. Therefore this type of spear-head is certainly not to be identified as a *sarissa*-head, rather they most probably belonged to hunting-spears.

THE SHAFT

Lammert thought that the *sarissa* would have had a shaft of ash, as this wood was used universally by the Swiss and others in the great age of the pike in European warfare. Snodgrass supports this suggestion²². The quality of ash which makes it so popular for spears is its combination of

¹⁷ J. Harmatta, *The Golden Bow of the Huns*, „Acta Archaeologica Academiae Scientiarum Hungaricae” 1951, No. 1, p. 107–149; L. Gyula, *The significance of the Hun Golden Bow*, „Acta Archaeologica Academiae Scientiarum Hungaricae” 1951, No. 1, p. 91–104; N. Feltich, *L'arc hunnique en Or*, Arch. Hung. 1953, No. 32, p. 171–177.

¹⁸ *The Search for Alexander: An Exhibition*, 1980, p. 186, nos. 169; M. Andronicos, *Vergina. The Royal Tombs and the Ancient City*, 1984, p. 144–146.

¹⁹ M. M. Markle III, *Weapons from the Cemetery...*, p. 257.

²⁰ See M. Andronicos, *Vergina...*, p. 97, 98–99, fig. 55, 118, fig. 73; cf. N. G. L. Hammond, *Training in the Use of the Sarissa and its Effect in Battle, 359–333 B.C.*, „Antichthon” 1980, No. 14, p. 53–63, esp. p. 54 n. 5.

²¹ See eg. M. Andronicos, *Vergina...*, p. 115, fig. 70.

²² Lammert, PW sv., *Sarisse*, col. 2517; A. M. Snodgrass, *Arms and Armour of the Greeks*, London 1967, p. 119.

strength, flexibility and lightness. Pliny (H.N. 16.84 [228]) tells us that "Ash is the most compliant wood in work of any kind, and is better than hazel for spears, lighter than cornel, and more pliable than service-tree (sorb); [...] The elm would rival it were not its weight against it". His judgement is supported by an experiment on the properties of various woods carried out by the Royal Society on 23 March 1663²³.

The experiment of breaking several sorts of wood was begun to be made; and there were taken three pieces of several kinds, of Fir, Oak, and Ash, each an inch thick, and two feet long; the Fir weighed 8 ounces, and was broken with two hundred pounds weight; the Oak weighed 12 ounces, broken with two hundred and fifty pounds weight; the Ash weighed 10 ounces, broken with three hundred and twenty-five pounds weight.

Ash was used whenever possible in early modern Europe to manufacture pikes. References to a preference for ash abound. The anonymous treatise entitled *The English Military Discipline* which has already been mentioned above (n. 4), tells us that "All pikes now a dayes are of the same length, made of strong ash, and very straight". Nearly all military manuals of the period recommend ash; none recommend other woods. Surviving examples of pikes are universally made of ash-wood, and surviving armoury inventories record ash-wood pikes held in store²⁴.

The ancient Greeks displayed a similar preference for ash for spear-shafts. Homer refers to ashen spears several times (eg. II. 5. 66, 19. 390, 22. 225) and occasional references also appear in later authors (eg. Tyrtaios frg. 19. 13). As regards the *sarissa*, Statius, a poet of the first century A.D., specifically states that (Theb. 7. 269) "The Macedonians by custom shake ash *sarissa*" (*fraxineas Macetum vibrant de more sarisas*). Statius is a most unsatisfactory source for information on weaponry, being much given to mentioning items of military equipment as improbable as bark shields etc., but this remains our only piece of evidence for the wood of the shaft of the *sarissa* from ancient literature. Given the universal demand for ash for pikes in the seventeenth century, and the abiding popularity of ash for spears in Antiquity, his testimony should be accepted. We should note that Macedonia was well provided with ash in Antiquity (Theophr., Hist. Plant. 3. 11. 3-4).

Another passage in Theophrastus (Hist. Plant. 3. 12. 1-2) has been misinterpreted to state that cornel-wood was used for the shaft of the *sarissa*. As with the spear-head this has been widely accepted in the modern literature, and it has been calculated that a cornel-wood shaft measuring less than 15 feet would have weighed over 9 lbs minus the weight of the spear-head and -butt (see note 11 above). In a treatise written in 1612 by

²³ Reported by J. Evelyn, *Silva: etc.* (1776 edition, York with notes by A. Hunter), p. 528.

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²⁴ Eg. C. H. Firth, *Cromwell's Army*, 3rd ed. London 1921, p. 73, nt. 2.

a colonel from Franconia in Germany the weight of an old 16th. century *Langspeiß* measuring 17 feet was 7 lbs, while that of a contemporary Netherlandish pike measuring 16.5 feet was 5.5 lbs²⁵. Even assuming the calculation of the measuring of the cornel-wood shaft not to be an underestimation, it is clearly much heavier than the measurements we have for early Modern pikes.

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The virtue of cornel-wood is its strength. Pliny (H.N. 16. 76. 206) tells us that cornel-wood was useful for little except the spokes of wheels and for wooden wedges or bolts "which are as hard as iron" (*ceu ferreis*). It was sometimes used for spears, but generally only for smaller ones on account of its weight, which would rule it out for a weapon as long as the *sarissa*. Typically cornel-wood was used to manufacture hunting javelins, as is mentioned by Pliny (H.N. 16. 76. 186 – *venabulum*). He goes on to state that cornel hunting javelins were bright yellow when notched with incisions for the purpose of decoration. Presumably the bark was left on. Cornel-wood was also used to manufacture the short, strong Persian *palton*, the javelin-cum-fighting spear carried in pairs by the Persian cavalry²⁶. A broken lance is shown beneath the figure of a Persian nobleman being speared by Alexander on the Alexander mosaic from Pompeii. This lance is probably a Persian *palton*. The rough surface of the shaft seems to indicate that it has been made from the branch of some tree only roughly smoothed down²⁷. In the fourth century, on the recommendation of Xenophon and other mercenary officers returning from service in Asia, cornel-wood also came to be used for Greek cavalry spears (Xen., *Peri Hippikes* 12. 12). Cornel-wood would make a strong cavalry spear not liable to break in the confused hand-to-hand fighting of the cavalry melee. However most cavalry spears were not as long as the *sarissa*. Cornel-wood would have been too heavy to use in such a long spear.

Another current misconception concerning the *sarissa*-shaft involves the method of its construction. A belief exists among some historians that the *sarissa* would be constructed from a branch or branches of suitable size and straightness cut from a tree. This is most improbable. Branches are rarely used for fighting spears. Occasionally, as in the case of the cornel-wood javelins mentioned above, they might be used for javelins or fighting-spears if the branches are very straight and of an extremely hard wood. As a general rule, though, branch wood is too sappy to have great strength, and, even if a good length of straight branch can be found, it tends to warp as it dries out. The life of the warrior depends on the strength and straightness of his spear-shaft. Therefore the more normal method of

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producing spear shafts was to split the trunk of a tree into suitable segments using wedges.

Some studies on spear production in prehistoric Britain have been undertaken. Previous to these studies the common assumption was that spear-shafts were obtained by coppicing, that is by cutting straight branches thrown out by the stump of a tree felled previously. However analysis of sections of preserved spear staves has shown that they were normally obtained from a tree-trunk split apart with wedges²⁸.

The wedge and maul are still the standard tools used by people living in wooded areas to split logs for firewood. I record the following procedures from personal observation of the methods employed in country districts to prepare firewood. When a tree has been felled it is trimmed of branches and bark. The tree-trunk will then be cut up into manageable lengths of a metre or so, which will be neatly piled and left for a while. The next step is to split up these logs into billets of a handier thickness. Each log is inspected for any split or sign of weakness which will hasten the work of splitting, and is then given a sharp blow with the felling-axe at any point of weakness. If there are no obvious points of weakness, a notch is made in the corner of the flat face and the side of the log, and into this notch is inserted an iron wedge. The felling-axe is now exchanged for an iron-headed sledge-hammer – the back of the axe-head is never used for hammering as this would distort or break the socket into which the shaft is fitted²⁹. The wedge is now driven into the log with repeated blows from the sledge-hammer until the log splits in two. If the two halves of the log are still joined by fibres of wood they are cut away with the axe or with a hatchet. This process is repeated until billets of the required size are obtained. If a billet is already rather thin it is sometimes split in two merely with a couple of sharp blows from the axe. The billets are, in their turn, neatly stacked for storage until required, and are later sawed into handier lengths for the fireplace.

No passage describing the method used to obtain spear-shafts in Antiquity has survived, but the use of wood from the tree's trunk is implied by the passage of Theophrastus quoted earlier. This mentions that the "female" cornel has heart-wood, and "is softer and goes into holes wherefore it is useless for javelins". The mention of heart-wood (or pith – *ἐντεριώνη*) indicates that Theophrastus is talking of wood from the tree's trunk, and makes it highly likely that the normal method of making javelins was to split up the trunk of a tree into sections.

²⁸ S. V. E. Heal in *Woodworking Techniques before AD 1500*, ed. S. McGrail, "British Archaeological Reports, International Series" 1982, No. 129, p. 103.

²⁹ Cf. H. L. Edlin, *The Foresters' Handbook*, London 1953, p. 201.

There are few parallels for the use of the wedge in preparing spear-shafts from other periods in history, but some material does exist. The Dani of New Guinea used to manufacture their fighting spears with similar methods as late as the 1960s. The following passage describes how two Dani tribesmen manufactured their spears³⁰.

Tekman Bio, meanwhile, had found a fine straight laurel pole, fourteen feet long when dressed; with Yeke Asuk, he split it down its length, using log wedges. One piece was split again in two, and the best of three lengths was stood against a boulder and its bark chipped away.

The length of wood was then chipped with stone, scraped with a boar's tusk, and rubbed with coarse grass until smooth. It was waxed and greased, and then warmed over the fire to straighten any imperfections in the spear. This fits in well with the methods deduced for the production of spears in the British Neolithic. Similar methods must have been used in the ancient world. The development of metal saws by the ancient Mediterranean civilizations had generally led to the abandonment of the wedge and maul for most uses of wood. The use of the saw to square timbers for use in construction, for example, had become general, but the more primitive method using wedge and maul was still widely known³¹.

Despite the availability of metal saws, the Macedonians would have used the wedge for the production of spear-staves for the following reason. Although the process of seasoning timber, that is of removing surplus sap before use, is unknown to the Dani, it certainly was known in Antiquity. To ensure that warping, which would spoil the long straight timbers needed for pike-shafts, was kept to a minimum, it has always been recommended that the tree should not be touched with the axe until the winter months when the sap has ceased to rise in the ash. The tree would then be "ringed" – cut through to the heart wood, and the tree would be left to die slowly; the sap running out of the trunk where the sap wood had been cut through. As Pliny puts it "elm and ash are tough but liable to warp, although they are flexible; and they are more reliable if the trees are left standing and dried by ringing around the trunk" (Pliny, H.N. 16. 79. 219; cf. Vitr., De. Arch. 2. 9. 3, 2. 9. 11). However carefully the tree may be cut and seasoned it is impossible to avoid the development of shakes, or internal cracks, in the trunk as the timber dries out³². If a saw were used to divide the tree-trunk up into squared lengths for eventual shaping into spear-staves, such lengths would contain these weaknesses. If the timber is

³⁰ P. Matthiessen, *Under the Mountain Wall*, London 1963, p. 128.

³¹ Verg., G. 1.144; Sen., Ep. 90.9.

³² A. L. Howard, *A Manual of Timbers of the World, Their Characteristics and Uses*, London 1948, p. 40.

split with wedges following these lines of weakness the resulting segments will be much stronger. This method is noted by John Evelyn, famous as a seventeenth-century diarist, but also a writer on timber³³.

We spake before of squaring; and I would now recommend the quartering of such trees as will allow useful and competent scantlings, to be of much more durableness and effect for strength... for there is in all trees an evident interstice, or separation between the heart and the rest of the body, which renders it much more obnoxious to decay and miscarry.

Apart from the greater strength imparted to the pike-stave by using timber from the trunk rather than branches, trunk timber also guaranteed the length and straightness required. We are, after all, talking of beams of timber for pikes up to 16 cubits (24 feet) long. Diocletian's code of prices, when referring to timber prices, gives the standard length of ash timbers as 21 feet, so such lengths were by no means unobtainable³⁴. Indeed Pliny (H.N. 16. 24. 63) tells us that "In Macedonia there is a very large ash making a very flexible timber".

The ash is without equal among European trees for providing long straight timbers without faults or flaws in the grain, and this has given the tree an abiding military popularity. During the First World War the ash was found to be invaluable for the production of British aircraft. A great number of pieces of timber were required up to 32 feet in length, with straight and even grain throughout the whole length, and free from the slightest defect, to make the spars and longerons, and the keels and ribs of the gondolas. The Air Board made great efforts to ensure a regular and adequate supply of timber:

An organization known as the "Aerial League" was formed, one of the functions of which was to approach every landowner throughout the country, with the object of securing from him at a moderate price the whole of the ash trees growing on his estate which could be used for aircraft purposes³⁵.

The efforts of the Aerial League to meet the demand for ash from home sources were not entirely successful, and quantities of French timber had to be imported. These trees had been produced under the French forestry system, much superior to that in Britain at the time, and were of better quality than the British trees. Similar problems seem to have existed in the 16th century concerning the supply of native ash for pikes. The military theorist Matthew Sutcliffe, writing in 1582, recommends a pike of

³³ J. Evelyn, *Silva...*, p. 522-523.

³⁴ R. Meiggs, *Trees and Timber in the Ancient Mediterranean World*, Oxford 1982, p. 366-367.

³⁵ A. L. Howard, *A Manual...*, p. 41-42.

Spanish ash of between 20 and 22 feet long overall³⁶. In fact much of the equipment of the English army at that period was obtained from Spanish arsenals by bribery³⁷.

The Spanish seem to have had a thoroughly organized system of plantations designed to meet their needs for pike shafts. When discussing the various methods of propagating ash John Evelyn tells us³⁸

Ash may be propagated from a bough slipt off with some old wood a little before the bud swells, but with difficulty by layers. Such as they reserve for spears in Spain, they keep shriped up close to the stem, and plant them in close order, and moister places. These they cut above the knot (for the least nodity spoils all) in the decrease of January, which were of the latest for us.

We can see that the Spaniards planted whole woods of ash cuttings at the same time and planted them close together. This would force rapid and straight growth in the sapling. These long straight poles would presumably be cut off once the trees had reached a useful height and then be split up into a number of pike-shafts.

I think it is not too rash to speculate that the highly organized and militaristic bureaucracies of the Hellenistic kingdoms might have taken similar precautions to keep their armies supplied with pike-shafts. When one thinks of the military reforms introduced by Philip II, or the preparations for Alexander's invasion of Asia, or the mobilization of the Macedonian army against the Romans by Perseus, clearly large numbers of ash trees were needed for pikes and other spears at short notice. Trees take decades to reach maturity and it is reasonable to suppose that forestry planting and protection programmes were put in place. Theophrastus (Hist. Plant. 5. 8. 1) tells us that during the 4th century the kings of Cyprus took great care to limit the exploitation of the native timbers, which Demetrios Poliorketes later used in the construction of his fleet³⁹.

If we return to the subject of the method in which the pike-shaft was prepared, it seems that the ash saplings would be split up and prepared (smoothed down and waxed or painted) in a way little different from that used by the Dani. Xenophon has his legendary figure of Cyrus recommend that those of his soldiers who have been taught (*sic*) how to whittle down a *palton* should bring along a *xuele*, or spokeshave, and a wood-rasp to turn out properly prepared spear-shafts⁴⁰. This stage of the operation called

³⁶ M. Sutcliffe, *The Practice, Proceedings and Lawes of Armes*, London 1593, p. 186.

³⁷ C. G. Cruickshank, *Elizabeth's Army*, London 1966, p. 119.

³⁸ J. Evelyn, *Silva...*, p. 155.

³⁹ On this text and other evidence for royal forestry see M. Rostovtzeff, *The Social & Economic History of the Hellenistic World* (2nd. ed. 1953) II, p. 1168-11, III p. 1612-1613, nn. 111, 113.

⁴⁰ Xen., Cyr. 6. 2. 32; for the *xuele* see J. K. Anderson, *Sickle and Xyele*, JHS 1974, No. 94, p. 166.

for some skill. It seems that a separate trade of "spear-whittler" (*δορυξόος*) existed in ancient Greece. Spear-shafts were produced in quantity in a special workshop called a *δορυξεῖον*⁴¹. Given that Xenophon talks of those who have been taught to whittle down a *palton*, it seems as if we are talking of an established skill passed on from tradesman to apprentice. We might compare the situation in England during the reign of Charles I. In 1631 London had three pike makers: John Edwards, Robert Tucker and Bartholomew Ray "And because divers cutlers, smyths, tynkers, and other botchers of arms, by their unskilfulness have utterly spoiled many armes, armours, gunnes, pikes and bandoliers" the King legislated that weapons (including pikes) could only be constructed or altered by artisans having served seven years' apprenticeship⁴².

In summary, then, the production of pike-shafts is not a straightforward matter of cutting a long branch from a tree. One of the reasons ash was favoured was that it was one of a very few trees which could supply unflawed timber of the correct length. Even then I would guess that some efforts were made to establish plantations of ash, close planted to force rapid straight and branchless growth, so as to guarantee a steady supply of timber of the desired length and quality. When the young trees had reached a suitable height they would be felled during the winter months when the sap had ceased to rise. Probably the trees were ringed and bled before felling. At this point one guesses that professional pike makers took over. The young felled trees would be seasoned and split up into a limited number of sections using a wedge and maul. Any flawed sections would be discarded and great attempts would be made to take out any shakes when splitting up the tree trunk. Those sections not rejected for weakness would then be smoothed round with a *xuele*, great attention being taken at this stage to keep the shaft straight. It would finally be smoothed off with a wood rasp. The last stage would be to wax the pike handle, and perhaps to paint it as well, to avoid it rotting during storage.

THE BUTT

The usual purpose of a metal spear-butt is to enable the spear to be planted in the ground when not in use, instead of being left to lie on the ground to become damp and start to rot and warp. Pikes, because of their length, are usually too difficult to bring under cover, either into a house

⁴¹ Hsch. sv *δορυξεῖον*; Etym. Magn. 283, 34 (*δορυξόος*); PTeb. 278. 4; Plut., Vit. Pel. 12. 1; Ar. Pax 447, 1213.

⁴² F. Grose, *Military Antiquities...*, p. 324, 330.

or bivouac, and have to be left outside. The long spears of the Dani of New Guinea are too tall to be brought into the huts, so they are left outside. These spears, 14 to 18 feet long, are tapered to a blunt point at the butt end so that the spear can be stuck into the ground⁴³. Some, but by no means all, Renaissance and post-Renaissance European pikes had butts. Figure 5 shows a surviving example of a pike head and butt of the model designed by Benjamin Franklin for issue during the American War of Independence⁴⁴. Figure 6 shows 16th century German infantrymen in camp who have left their pikes planted in the ground.

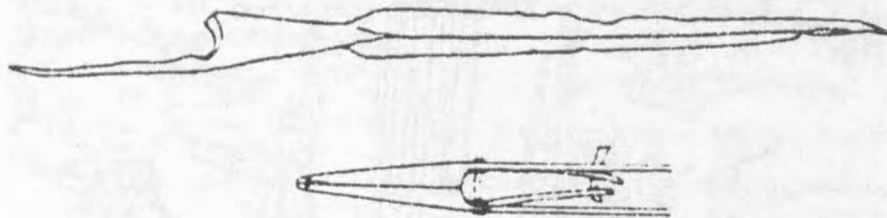


Fig. 5. Pike head and butt from a model designed by Benjamin Franklin for issue during the America War of Independence. The pike-head was based on contemporary designs for naval boarding pikes, and so is longer and thinner than one might normally expect

One less obvious advantage the fitting of a metal butt to the pike would give is that it would discourage the abuse of cutting back pikes. It needed some considerable strength to manage a pike, particularly on a windy day. The strongest and largest men were selected for service as pikemen, as the weaker tended to tire too early. It became a frequent practice in early modern times to cut a length off the end, particularly when engaged in a long-distance march⁴⁵. As well as making a body of pikemen look like a set of organ-pipes, this could have disastrous consequences once battle was joined, for when a unit of short pikes met a unit of long pikes "the shortest before he came home [ie. reached its target] fell from his master's hands, the carrier being dead"⁴⁶. Of the pike Sir James Turner, an experienced Scots mercenary officer who had served in the Thirty Years War, said⁴⁷

⁴³ P. Matthiessen, *Under the Mountain...*, p. 19, 46-47.

⁴⁴ D. Bashford, *On American Polearms, especially those in the Metropolitan Museum of Art*, "Metropolitan Museum Studies" 1928, Vol. I, p. 32-48, cf. p. 46, fig. 43, 44.

⁴⁵ Ch. H. Firth, *Cromwell's Army...*, p. 73-74.

⁴⁶ G. A. Hayes-McCoy, *Irish Battles*, London 1969, p. 194.

⁴⁷ Sir James Turner, *Pallas Armata*, 1683, p. 176.

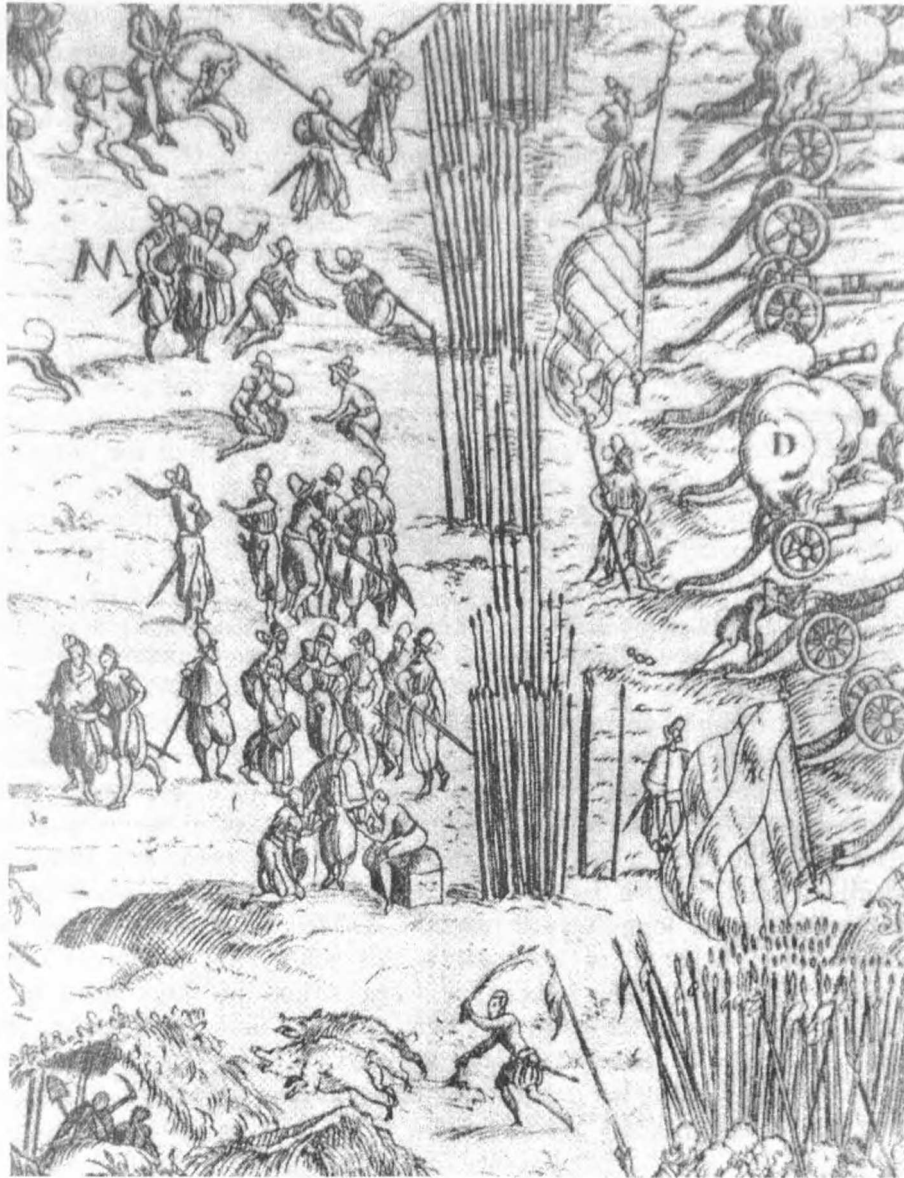


Fig. 6. Strands of pikes set up by infantry in camp (From an illustration in Leonhard Fronsperger, *Von Kayserlichen Kriegsrechten etc.*, 1566)

the longer it is (so it be manageable) the more advantage it hath. In our Modern wars it is order'd by most Princes and States to be eighteen foot long, yet few exceed fifteen; and if Officers be not careful to prevent it, many base Soldiers will cutt some length of that, as I have oft seen it done: It were fit therefore that every Pike had the Captains name or mark at each end of it.

As we can see, there were good practical reasons for fitting pikes with butts. Most Greek fighting-spears seem to have been fitted with metal butts, so there is no reason to suppose that this practice finished in Hellenistic times with the general adoption of the *sarissa*. It is unfortunate that we have no representation of the butt-end of a *sarissa*.

None of our principal literary sources dealing with *sarissa* mention a spear-butt (*styrax*, *styrakion* or *sauroter*) and most modern authorities, including Lammert, do not believe that one was used. One exception is Reinach, followed by Andronicos⁴⁸, who accepts the testimony of a Byzantine anonymous writer who notes⁴⁹

ἡ δὲ σάρισα Μακεδονικὸν ὄπλον ἐκτεταμένον ἔχον τὸν στύρακα καὶ πρόμηκες τὸ σιδήριον.

The *sarissa* is a lengthy Macedonian weapon with a butt and a projecting iron (point):

Although this piece of evidence is of a very late date, and perhaps unreliable, there is no particular reason we should discount it. One should consider Diodorus' account of the capture of the Persian camp after the battle of Issus and the violation of the Persian women found there. He says they were either dragged away by the hair, or, stripped naked, were driven along with blows from the hand or from the "stathmoi of their spears" (στάθμαις τῶν δοράτων) against their naked bodies⁵⁰. In this context the word *stathmos* could mean either spear-shaft or spear-butt. It is usually translated as spear-butt, but the word *stathmai* only occurs in a similar context once elsewhere⁵¹. We cannot be certain that spear-butts are being

B.U.L.

⁴⁸ Lammert, PW sv. *Sarisse*, col. 2519; A.-J. Reinach, *Sarissa*, Dar.-Sag. sv., p. 1076; Andronicos, BCH 1970, No. 94, p. 104.

⁴⁹ From the short Byzantine manuscript entitled *Ἐκ τοῦ λόγου τοῦ φάσκοντος ὅτι ἐκ τῶν ἐπινησίων Ἀριστοτέλους Ἀλέξανδρος ὁ βασιλεὺς τὰ τρόπαια ἴστα καὶ τὰς πόλεις ἐλάμβανε* from *Paris Codex* 396, p. 427. J. Fr. Boissonade, *Anecdota Graeca*, Vol. I, Paris 1829, repr. Hildesheim 1962, p. 174; H. Kochly, R. Rustow, *Griechische Kriegsschriftsteller*, Bd. III, Leipzig 1855, p. 215. Boissonade (p. 174, nt. 3) gives a further reference to the *sarissa* "*De sarissa Macedonia ad Plan. Met.*", p. 536 which I am unable to make any sense of or to pursue further. As to the general sense of this passage and the use of *πρόμηκες* cf. the *ξυστοὶ εὐμήκεις* of Jul. Or. 2. 60 A and see A.-J. Reinach, Dar.-Sag. article *Sarissa*, sv. p. 1077 nt. 1. I interpret *πρόμηκες* here simply to refer to the spear-head.

⁵⁰ Diod. 17. 35. 7.

⁵¹ C. C. Edgar, *Catalogue general des Antiquites egyptiennes du Musee du Caire: Zenon Papyri*, Vol. IV, p. 207, nr. 59782 (a), v. 49. This is a list of iron objects. The *stathmai* are iron, so an interpretation as spear-butt is preferable to, for example, spear shaft.

referred to rather than spear-shafts; nor can we be certain that the rapists in question are *sarissa*-bearing Macedonians, nor that Diodorus is here quoting a detail from a trustworthy source rather than a literary embellishment. Nevertheless this is another (admittedly featherweight) scrap of evidence that we can throw onto the scales in favour of the existence of a *sarissa*-butt.

One possible example (Fig. 7), of unknown provenance, is now in the Greek Museum of the University of Newcastle Upon Tyne⁵². It is bronze, 38 cm long, and has traces of pitch inside to bind it to the shaft. Upon cleaning in 1977 the black letters MAK were uncovered around the socket under layers of corrosion. A date in the late fourth century B.C. has been suggested on the basis of the letter-forms.

The lettering on the Newcastle butt is contained within two black bands. These bands are paralleled by the two black bands shown on the spear-heads of the Macedonian pikes on the Alexander mosaic from Pompeii (Fig. 2). These can be seen most clearly on the spearhead above the head of Darius. On some of the other spearheads shown on the mosaic the two bands are less distinct, or only one band is shown, but this could be a copying error of the mosaicist. MAK must be an abbreviation for Macedon and the implication of this piece must surely be that equipment was produced, held and issued on a large scale through military armouries. So the production of spears in ancient Macedonia, as in later Spain, could have been a thoroughly organized affair from the tree-planting stage onwards. There is, however, nothing to show that the Newcastle example is a *sarissa*-butt rather than any other type of spear-butt.

In another attempt Henry Lumpkin has identified the tip of a broken spear-shaft, shown on one of the reliefs from the balustrade of the Temple of Athena Nikephoros at Pergamon (Fig. 8), as a *sarissa*-head⁵³. He writes "It has the typical disc or button below a triangular point designed to punch through metal armour but not penetrate too deeply". At first glance this is an attractive theory. Later European pole-arms were frequently furnished with a cross-piece, or *arret*, for this purpose. However only the normal form of *arret*, a cross-piece as in later European examples, is found and then only in representations of spears on South Italian vases.

⁵² *Greek Arms and Armour*, The Greek Museum, The University of Newcastle Upon Tyne (Catalogue printed by the Museum, Text: Patricia Foster, under the direction of Brian Shefton 1978) p. 13.

⁵³ H. Lumpkin, *The Weapons and Armour of the Macedonian Phalanx*, "Journal of the Arms and Armour Society", June 1975, Vol. VIII, No. 3, p. 196. P. Couissin in *Rev. Arch.* 1927, No. 1, p. 151, 152, fig. 2 had previously tentatively identified the point as a Galatian lance-head.



Fig. 7. Spear-butt from Newcastle lettered MAK (Photo: The Greek Museum, University of Newcastle upon Tyne)

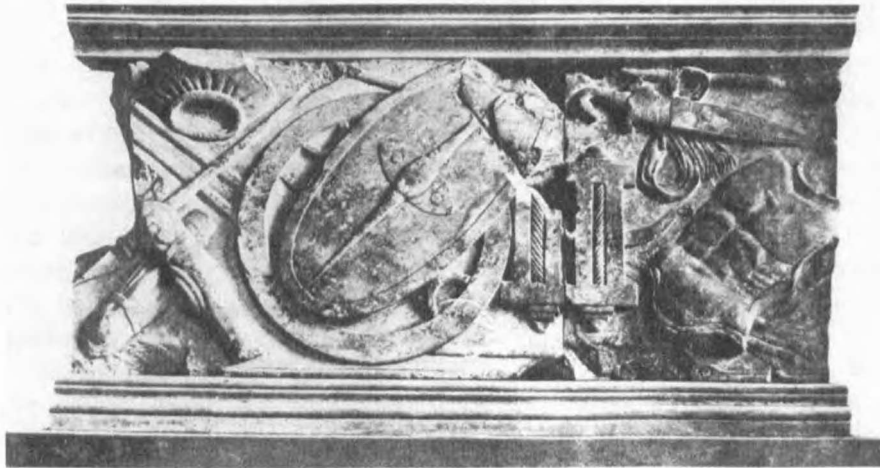


Fig. 8. Broken spear-shaft and butt from the balustrade of the Temple of Athena Nikephoros, Pergamon (Photo: author)

The button and spike on the Pergamene relief is much more likely to be a spear-butt. One type of Greek spear butt in classical times is of a similar form, that is “button and spike”, though the spike has not yet become as squat as in the Pergamene example⁵⁴. The “button and spike” spear-butt seems to have been popular through to the Imperial period – a Roman soldier on the Portonaccio battle-sarcophagus⁵⁵ wields a broken spear with a butt of similar type, though the button has shrunk in size so as to almost disappear. The Pergamene representation, then, seems to show a Hellenistic spearbutt, probably Macedonian, but, as with the Newcastle example, it is impossible to tell whether the “button and spike” spear-butt belongs to a *sarissa* or to another type of spear.

⁵⁴ Eg. P. E. Arias & Max Hirmer trans. B. B. Shefton, *A History of Greek Vase Painting*, London 1962, pl. 188, 236 (upper register, centre).

⁵⁵ G. Koch, H. Sichterman, *Römische Sarkophage...*, pl. 76 main frieze, centre right. Although he does not discuss this object, one should note that P. Couissin, *Les Armes Romaines*, Paris 1926, p. 368 thinks that a similar point on another relief is the head of a late and peculiar form of *pilum*. I believe that the figure of the Portonaccio battle-sarcophagus is using a broken spear in view of the way he is holding his spear back-handed (ie. the thumbs are not facing forward). The opinions of Couissin, one of the foremost authorities on ancient weaponry, deserve the most careful consideration. I have decided to depart from them only with considerable reluctance.

THE "CAVALRY SARISSA"

So far our discussion has been limited to the infantry version of the *sarissa*. The *sarissa* was carried by one of the light cavalry regiments of Alexander's Army, the *prodromoi*, who were also known as the *sarissophoroi* during the time they were armed with the weapon. The fact that this title is given only to one cavalry regiment to the exclusion of all others and as a distinguishing title, indicates that the rest of the cavalry did not carry the *sarissa*. As a general rule infantrymen carry weapons specifically designed for the infantry and cavalrymen carry weapons specifically designed for the cavalry. Exceptions to this rule do occur but are rather rare. It is safe to suppose that the *sarissophoroi* carried the *sarissa* for a specific tactical purpose. Of the *sarissophoroi* General J. F. C. Fuller wrote that "these men usually operated like Cossaks", presumably thinking of the Cossacks' long lance and their role as scouts and raiders. In battle he seems to think that their long lances were designed to hold the enemy at a distance⁵⁶.

The spear which was in general use among units of cavalry during the Late Classical and Hellenistic periods was a weapon called a *ξυστόν* (*xyston*), or "whittled" spear. *Xyston* is an old word which appears in the *Iliad* (eg. 15. 678). Sometimes it is used as a word for the shaft, and sometimes it seems to mean javelin⁵⁷, but in the period of Alexander and the Hellenistic kings it seems to have taken on a more specific meaning as a cavalry lance. In fact a whole branch of the cavalry, the *xystophoroi* or "lancers", comes into being during the Hellenistic period, named after their principal weapon⁵⁸.

The Companion Cavalry used the *xyston* during the reign of Alexander. Plutarch (Vit. Alex. 16. 11) mentions that at the Battle of Granicus Kleitos the Black saved the life of Alexander by killing the Persian Rhoisakes with his *xyston*. In his account of the battle Arrian (1. 15. 5-8) tells us that the Macedonian cavalrymen were getting the better of the battle because they were fighting with cornel-wood *xysta* against the *paltai* of the Persians. At this point in the battle Alexander's spear was broken. He called on Aretas, one of the royal grooms, to hand over his spear, but Aretas had broken his lance and was fighting on with the broken half. Shortly after

⁵⁶ J. F. C. Fuller, *The Generalship of Alexander the Great*, 1958, p. 51, and in *The Encyclopaedia Britannica*, ed. 1951, Vol. 14 "The Macedonian Army", p. 566, fig. 3c "Lancers holding enemy's left".

⁵⁷ Eg. Hdt. 1. 52, 2. 71; Suid. sv. ξυστόν; Hsch. sv. ξυστοῖς, ξυστόν ἀκόντιον.

⁵⁸ D. Head, *Armies of the Macedonian and Punic Wars 359 BC to 146 BC*, (Wargames Research Group, 75 Ardingly Drive, Goring-by-Sea, Sussex BN12 4TN, 1982), p. 116-117 suggests the *xystophoroi* were distinguished from the remainder of Hellenistic cavalry by not carrying shields with their long lances.

Alexander kills Spithridates by pushing his *xyston* through the Persian's cuirass. Then Arrian (1. 16. 1) tells us the Persians started to lose as they and their horses were being struck in the face with *xysta*. From these passages we can see that the spear used by the Macedonian Companion Cavalry was a *xyston*, it was made from cornel-wood (unlike the *sarissa*), and it was possible to fight with the rear end of it when it was broken in battle. Further details of the *xyston* can be seen in representations of Macedonian cavalry of the period.

In the "Alexander Mosaic" from Pompeii Alexander's *xyston* seems to be about nine and a half or ten feet long, about the same length as the spear used by the cavalryman on the fresco from the "Kinch" tomb at Naoussa (Fig. 9). The lance held by both these figures does not have a butt: it rather has a second, subsidiary, spear-head. A poem of Leonidas of Tarentum, who wrote in the first half of the third century B.C. (Anth. Pal. 6. 131) mentions whittled double-pointed spear-shafts (*ξεσταί τ' ἀμφιβολοὶ κάμακες*) captured from Lucanian cavalry. In the "Alexander Mosaic" the rider in the Boeotian helmet to the left and rear of Alexander



Fig. 9. Rider from the "Kinch Tomb" (after P. Couissin, *Les Institutions militaires des Grecs*, 1931, pl. 1)

is delivering an over-arm stab with the broken rear half of his *xyston*⁵⁹. The rear half of his spear is tipped with a spear-head. It would be unwise to consider the two-headed cavalry-lance as a Macedonian invention, as such a lance is shown on a relief from Argos (Fig. 10) which is obviously earlier in date⁶⁰.



Fig. 10. Horseman holding *xyston* in a relief from Argos (Photo: author)

The false identification of the *sarissa* as having a large leaf-shaped head has in turn led to the false identification of the spears carried by Macedonian cavalry in the Alexander Mosaic and Kinch Tomb as *sarissai*. Hence there has arisen in the modern literature the concept of the “cavalry *sarissa*” as the weapon used by the majority of the Macedonian cavalry⁶¹. This idea is simply wrong.

Judging from the Issus mosaic the spear-head of the *xyston* seems to have been bigger and wider than the spear-head of the *sarissa*. This is to

⁵⁹ M. Robertson, *A History of Greek Art I*, 1975, p. 499; P. A. Manti, *The Cavalry...*, p. 76.

⁶⁰ Athens, National Museum, Nr. 3153; G. M. A. Richter, *Sculpture and Sculptors of the Greeks*, 1929, fig. 649.

⁶¹ Eg. Minor M. Markle III, *AJA* 1977, No. 81, p. 333; P. A. Manti, *The Cavalry...*, p. 73–80.

be expected. Unlike the pike, the cavalry spear is designed for stabbing against the exposed flesh of the enemy horse and rider, or against the exposed back of a fleeing infantryman. In the narratives of Alexander's campaigns, we hear repeatedly of Persian horses and riders being struck in the unprotected face with *xysta*⁶². The blade of a cavalry-spear is usually wide to open up a large debilitating flesh wound. A comparison from a later period confirms this usage. The lances of the Spanish cavalry proved to be most effective against the army which Cromwell sent to Hispaniola. One contemporary account describes the Spanish lance as "a most desperate weapon, they are very sharp, and so broad that if they strike in the body it makes such a large hole that it lets the breath out of the body immediately"⁶³.

CONCLUDING REMARKS

The study of weapons and army organization is only a portion of the study of that important human social activity called warfare, and not the most interesting aspect of it, but it is a necessary preliminary to further study. The Macedonian army under Philip and Alexander was the instrument that ushered in a new period of history – the Hellenistic Age, and it deserves to be better understood. We really cannot study the social, economic and political aspects of warfare in this age with any hope of obtaining a realistic picture, unless we have first sorted out the "nuts and bolts" of how the Macedonian Army of that time was equipped and really functioned.

The archaeology of warfare does not exist as a separate discipline, and so does not have a *corpus* of procedural theory. In these concluding remarks I would like to introduce "inherent military probability" as a concept which must be used as a tool in our research. There are certain constants running throughout warfare in all ages. This applies equally well to abstract considerations, like moral leadership and discipline, as it does to material ones like weaponry. Therefore the concept of "inherent military probability" is not restricted to the study of weaponry, it can also be applied as a heuristic tool to other branches of the study of warfare such as tactics or military systems.

In this article, however, we have been concerned with weaponry. When we seek to identify an item recovered by archaeological excavation with

⁶² Especially Arr., *Anab.* 1. 16. 1.

⁶³ Ch. H. Firth, *Cromwell's Army...*, p. 115. These broadheaded cavalry lances are illustrated in H. Innes, *The Conquistadors*, New York 1969, p. 58–59.

a weapon mentioned in the literary sources we have to exercise the utmost caution. Our identification must be tested against the evidence coming from other historical periods and only accepted if it is inherently probable from a military point of view. The *sarissa*, or Macedonian pike, is likely to have had the same or similar characteristics as the pike used in more recent times. An overwhelming preference for ash or for a small pike head in modern times allows us to disregard the odd example of spears in other woods or with other heads, which may have existed but which are deviations from the norm. The inherent military probability is, therefore, that pikes in Antiquity had the same general characteristics. This is why I have included so much comparative material on modern pikes in the article, which has not, I hope, stretched the patience of the reader too far.

Perhaps a parallel case might be instructive. The 18th century antiquarian, the Reverend Walter Harte, identified an officer's spontoon in a Swedish collection as a "Swedish pike". The weapon was 11 feet long, of which the head and socket took up no less than two feet, while the blade was four and a half inches wide at the bottom. Despite the obvious improbability of this mistaken identification, it has remained in the literature dealing with the army of Gustavus Adolphus up to the present day⁶⁴.

Nicholas V. Sekunda

SARISSA

W ostatnim okresie daje się zauważyć wzrost zainteresowania wojskowością czasów Filipa II Macedońskiego i Aleksandra III. Jedno z czołowych miejsc wśród studiowanych zagadnień zajmuje problem sarissy.

W pracy podjęto próbę wskazania elementów sarissy w materiale archeologicznym. W pierwszej kolejności analizowano kwestię grotu oraz drzewca sarissy. Dane archeologiczne zestawiono z tekstami Ksenofonta, Diodora, Plutarcha, Grattiusa oraz Teofrasta. Zwrócono uwagę na zawarte w nich niejasności, a także odniesiono się do szeregu dotychczasowych błędnych interpretacji.

W efekcie sądzić można, że macedońska sarissa to broń o takich samych cechach jak pika znana z czasów późniejszych. Dlatego też w artykule odniesiono się wielokrotnie do broni nowożytnej. W związku z powyższym wykazano na przykład, iż nie mają podstawy sądy o dużych grotach broni Macedończyków.

⁶⁴ W. Harte, *The History of the Life of Gustavus Adolphus*, London 1759, with the criticisms of R. Brzezinski, *The Army of Gustavus Adolphus: 2 Cavalry*, 1993, p. 34 to whom I owe this information.