

THE WELLINGBOROUGH AND NIJMEGEN MARCHES

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During 1984 organised walking events by the Waendal Walkers Club at Wellingborough, Northants and the Dutch K.N.B.L.O. at Nijmegen were entered by the society to carry out basic field trials of Roman military equipment under strict scrutiny and appropriate field conditions. Distances of 52 miles in two days and 100 miles in four days respectively were covered. The purpose was to wear Roman military equipment and march in it for a given length of time over distances that would bear comparison with the daily march routine of the legions as specified in the account of Vegetius,¹ and finally to assess the effects on both the reconstructions and the wearers.

The entrants commenced training during November of 1983 and progressively increased the tempo and length of the march until they were capable of covering the average official Northampton marathon route at an average speed of 4mph. Once this initial objective was attained the equipment was worn. Finally, four persons² representing a 1st century legionary in full fighting equipment, a light auxiliary of the same period and two 4th century infantrymen took part in the marches.³

EQUIPMENT

Armour

Owing to the difficulties encountered in obtaining suitable sheet iron the helmets, lorica and the blades of weapons were constructed from mild steel. We are nevertheless reasonably sure that this material would possess a tensile strength generally similar to the iron originals. Their manufacture which must have involved repeated hammering and reheating cycles in charcoal-fuelled forges would thereby have ensured a reasonably high carbon content in the finished product.

The Boots (caligae)

The caligae used were a standard pattern studded boot as found on numerous sites throughout Europe. The patterns for the uppers were taken from archaeological reports from Valkenburg, London and various forts along Hadrian's Wall. The stud pattern used came from Valkenburg Z.H. Holland.⁴ The open work upper is made from a single piece of cowhide with three or four sole

pieces sewn on and over 130 metal studs fitted into the flat bottom, with no raised heel.

Initially socks were not worn inside the caligae but persistent blistering soon forced their introduction. We were not unduly perturbed by this development as we accept that the Romans, whether military or civilian would be conditioned to walk for far greater distances than their modern counterparts. Furthermore, socks or at least their equivalent foot coverings are mentioned as having been sent to a soldier serving in the First Tungrian Cohort at Vindolanda in the period A.D.95-105.⁵

Whether socks were worn for the same reason as ourselves, or simply for warmth cannot be assumed for certain but the fact remains that an assessment of the durability of the boots and not our feet was the object of the exercise. As a result of taking this decision we finally managed to cover a distance in excess of 400 miles during both the training and the marches while wearing the reconstructed equipment. We believe, therefore, that this is sufficient justification in itself for the wearing of socks.

The boots were restudded immediately prior to the four day Nijmegen marches and the pattern of the studs was made in modern hobnails. Although we cannot be positive as to the differences of durability between our modern hobnails and the Roman originals, we feel if anything, that modern studs would be of a better quality.

By calculating the rate of wear of the studs, against the distance covered, we concluded that the legionary could march for 12 days on a metalled surface before all of his original studs would be worn down. By contrast, the light auxiliary was surprisingly harder on his boots which would have led to complete restudding and replacement of the originals after only 8 days! This unexpected result can only be explained by the fact that the two persons involved in the experiment marched in different ways. The legionary, in spite of his heavier loading placed his heel down first whilst the auxiliary seems to have dragged his toes on occasions which caused some part worn studs to be pulled out. On soft ground or unmetalled roads the studs would naturally have lasted longer.

We must acknowledge that the scope of this experiment was rather narrow as comparative results from only two pairs of boots can hardly be considered conclusive. For all that, it gives an average rate of wear of only ten days road marching before the sole begins to sustain damage. It must be qualified here that the wear takes place initially on the heel, toe and sole of the foot to a greater extent than the instep and that

these higher points require virtually daily replacement. The ten day average period is therefore the time for which the last original stud would last. This is not a long time, particularly taking into account the fact that for Roman soldiers, the replacement of equipment involved stoppages of pay. This high wear also highlights the legionaries' grievance over paying for studs particularly in the Pannonian mutiny of A.D.14 and two other references made to calacarium endorse the claims made by the mutineers in Pannonia:

Tacitus⁶ mentions an allowance called CLAVARIUM, or 'nail money', which was claimed by the Flavian forces marching on Rome. The motivation for the claim was that the long march had caused unreasonable wear in mens' boots which could only be replaced against stoppages of pay. The fact that the allowance had a name seems sufficient evidence for its existence.

Secondly, similar allowances, possibly the same as the above, are mentioned by Suetonius.⁷ When the Classiarii, who had to march regularly from Ostia or Puteoli to Rome, claimed 'boot money', Vespasian, with his customary dry humour, is said to have required them to make the journey barefoot. According to Suetonius they still did so in his day.

THE MARCHES

Effects on the Wearers

In temperatures of 70°F or above, all four marchers tended to sweat profusely in their woolen clothing but with one notable exception given below, the inconvenience, once accepted as inevitable became tolerable. The clothing however did tend to retain dampness overnight and a certain initial degree of discomfort was experienced on the following morning. The legionary who was obliged to undergo the additional imposition of having the upper part of his body encased in a steel lorica which permitted very little air to circulate, suffered from bouts of nausea and dizziness after three to four hours on the march. Weight loss was excessive and during one particular 26 mile march on a very hot day seven pounds were shed! On this occasion also, temporary blindness and disorientation were experienced over a period of approximately 30 seconds. Medical advice was sought and we were informed that a far larger intake of liquid would be required to counter dehydration and that the disorientation, vision failure and nausea were directly attributable to salt deficiency. Once these matters were attended to, no further symptoms recurred. It is interesting to relate this situation to the issue of salt (salaria) to the Roman soldiers. It would seem probable that they understood that

it was an essential requirement for maintaining a fast marching rate quite apart from its uses in flavouring and preserving meat. We must also assume that each man either carried with him, or had immediately available, large amounts of water. Although the stomach should never be overloaded at the beginning of a long march, small amounts need to be taken at frequent intervals. In our case, a fair approximation was half a pint per hour which means that half a gallon of water per person was consumed during the course of a day's march. Urination occurred seldom if at all.

Effects on the Equipment

Although the caligae came out rather well, the initially highly polished metal of the lorica and helmets deteriorated visibly under the repeated drenching in perspiration. We soon learned that a liberal application of grease would protect it from the worst effects of the corrosion. Unfortunately this led to the somewhat uncomfortable situation where arms, faces and legs soon became coated in turn and ultimately it became customary to exude an unpleasant odour compounded of grease and sweat which did nothing to endear us to the other marchers. At the end of the day, everything we ate and drank was similarly tainted. If we learned nothing else from this, we can at least be certain that Roman travellers who encountered a military unit on the march would have passed to windward!

At an early stage in the training, it was noticeable that certain loosely attached items of equipment either rattled, clanked or developed irritating propensities of one kind or another. Whilst this can be endured over short distances, a 25 mile march is quite another matter. We feel sure that the illustrations of Marius' Mule, for so long a feature of the history books, requires some revision as regards the disposal of his equipment. Free hanging items such as the patera, for instance, which is usually depicted as being suspended by the handle from the end of a carrying pole, would, we are quite certain, be more firmly secured. Quite apart from the adverse effects on the disposition of the soldier. The banging of the helmet during our initial attempts to suspend it from the right shoulder, in the manner portrayed on Trajan's Column, caused a metal hinge pin of 0.93in diameter on one of the cheekplates to fracture, therefore the durability of the equipment must be taken into account, as well as the carrying position.

Both the legionary and auxiliary swords tended to swing in against the hip and thigh and to shift position constantly as the march progressed. In order to counteract this unpleasant effect and prevent the need for constant readjustment, the belt

was passed over both baldric straps whereas formerly only the rear strap had been secured in this manner. The pommel, situated high up under the right arm pit, tended to chafe the bicep and at first this caused minor blistering. In the course of time the affected areas became calloused and hardened and therefore no further modifications to the position of the sword were considered necessary.

The suspension of the helmet on the march required some investigation. Hanging it from the shoulder plates proved difficult and ultimately caused damage to the cheekpiece hinge. Moreover it was very difficult to unfasten with any degree of urgency as would be required if a sudden attack developed whilst on the march. Hanging the helmet by its thong around the neck was initially comfortable, but after half an hour or so became painful despite the protection of the scarf. The solution quite simply involved hanging it across the chest by passing the thong through the horizontal chest strap on the lorica. This operation could easily be carried out whilst at rest or on the march and the helmet could be deployed with the same facility.

The carrying of the scutum also proved difficult. A possible solution has only now come under serious consideration. Though we have no information relevant to the arrangement of a carrying strap or harness, we feel sure one must have been employed. We therefore decided to improvise a reasonably logical stopgap expedient which utilized the hand grip as the load bearer. The scutum which we used was of a standard size. That is to say that it conformed generally to the dimensions of the Dura scutum and those of the shield covers from Vindonissa. A leather strap was fastened to both ends of the shield handgrip and the loop so formed placed over the right shoulder. In this manner the shield was carried in a high port position on the left side where it severely restricted vision in that direction. A lower position interfered with the movement of the legs and we therefore opted for the first choice as the carrying position. The carrying strap was tried in several different positions:

1. Locked around the left shoulder plates. This proved unsatisfactory. The downward pull of the shield caused the strap to jam progressively more tightly under the plates. It thereby proved almost impossible to disengage the shield without assistance. Despite the drawback in deploying the shield this was the least painful method attempted and our solution under consideration uses this method as a starting point.
2. The strap across the upper body and around the right side of the neck. A disaster! A process of slow strangulation took place.
3. Retention of the carrying strap by the projecting lorica plate (Epaulette) on the right shoulder. This possibility was

suggested by Nicholas Fuentes and accordingly tried over the first 25 miles at Nijmegen. This method produced an effect similar to that given in No.2 above. The right shoulder was compressed and forced upwards and inwards. Apart from the obvious discomfort, breathing was restricted and circulation cut off to the extent that towards the final stages of the march the right arm and shoulder were completely numb and useless for any practical purposes. It became essential to halt at more and more frequent intervals for readjustments to be made. It was found later that the internal rear leathers, although made of good quality calf leather about 0.125in thick, had been ripped and the rivets and washers attaching them to the metal plates were pulled free. All this in one day's march of 25 miles.

Consequently a *modus operandi* was developed, hence we believe the weight of the shield must be suspended vertically from the left shoulder and are currently experimenting with a simple harness that seems to work well, but we are reluctant to comment on it until it has been tried in the field. Our experience shows that the shield cannot be carried by hand alone over long distances, further that the wrong sort of carrying aid can be as painful and exhausting as no aid at all. A further report on our progress will be published as appropriate.

Insofar as the lessons learnt from the fourth century equipment are concerned, though of less significance they merit a brief mention. An almost total lack of armour with the exception of the helmet greatly facilitated marching, and except for profuse sweating caused by the woolen tunic and trousers, the marches were comparatively enjoyable. The large round flat shields were carried across the back by a single loop through the handgrip passed over the right or left shoulder according to preference. By the simple process of bending the elbow backwards against the projecting side of the shield and hooking the thumb into the belt on the appropriate side the shield was easily stabilised and no undue fatigue was experienced.

Initially the helmets and *spathae* caused minor problems. The latter was suspended on the left side by a baldric over which a waist belt was passed to lock it into position, but the chape of the scabbard hanging almost vertically downwards kept banging against the wearer's shins. The helmet had either to be worn or carried by hand. Eventually an ingenious solution was arrived at whereby the helmet thongs were knotted together and the helmet suspended by them over the hilt of the sword. In this manner, the weight of the helmet counterbalanced that of the sword and as a result the scabbard hung at an approximate angle of 30 degrees from the vertical, away from and behind the legs, thereby keeping the offending chapes well out of the way. In the

case of the two fourth century infantrymen modern suede boots were used. This compromise was forced upon us due to the fact that the reconstructed boots could not be broken in in time to ensure that blisters were kept to an acceptably low level. In point of fact, we believe that the boots which were worn bore a fairly close resemblance of those of the actual period. However no tests could be carried out on these particular items as they would be irrelevant.

NOTES

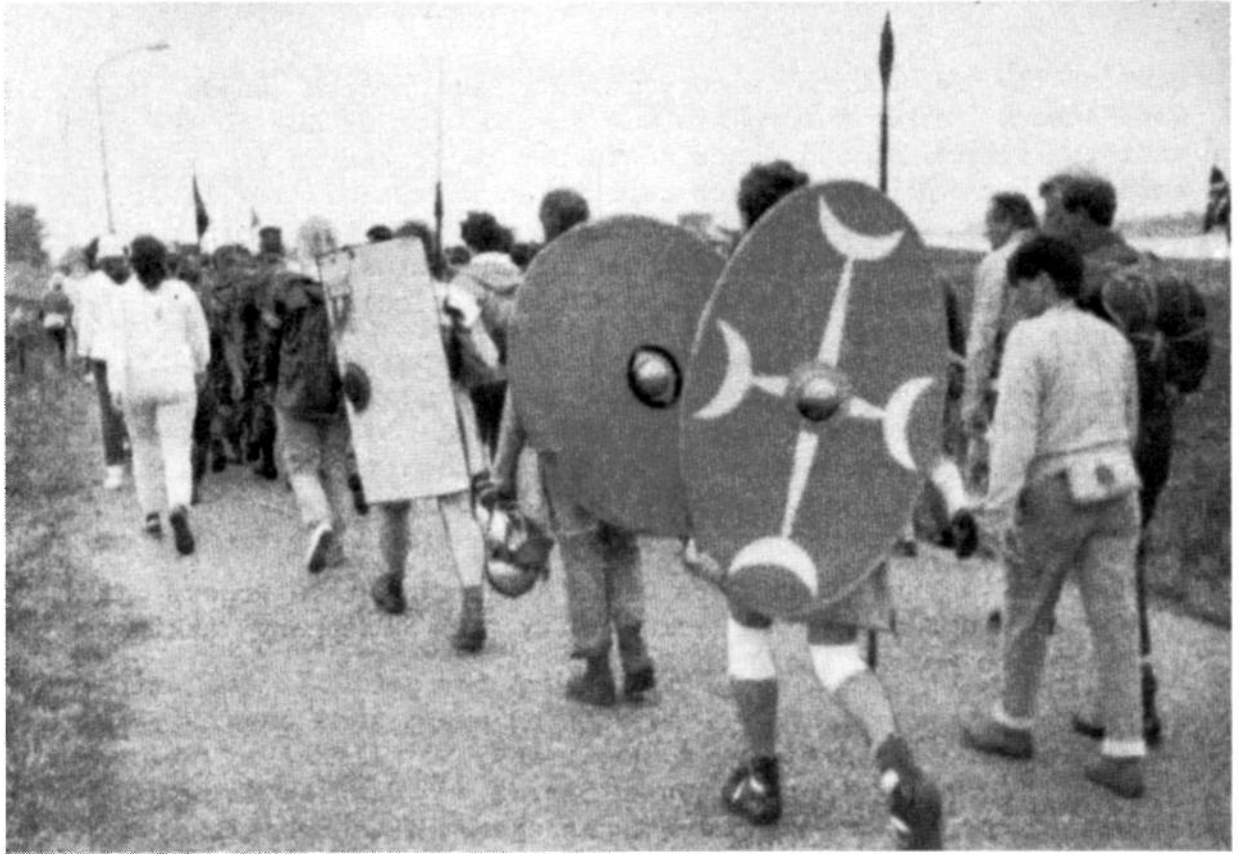
1. Vegetius Epitoma rei militaris.
2. Members taking part were David Atkinson, Steve Rogers, Mark Morgan and Len Morgan. Backup party was Stephany Atkinson, Elizabeth Morgan and John Eagle.
3. List of equipment:

| <u>Legionary 1st century A.D.</u> | lb | kg |
|--|---------------|-------------|
| Helmet (cassis) Imperial Gallic 'H' | 4.4 | 2.0 |
| Body armour (Lorica Segmentata) Corbridge 'B' | 18.959 | 8.6 |
| Military belt (cingulum militare) Cast plates | 2.64 | 1.2 |
| Dagger and scabbard (Pugio et vagina) | 1.54 | 0.7 |
| Fulham/Mainz pattern sword and scabbard (Gladius et vagina) | 3.52 | 1.6 |
| Boots (Caligae) | 3.3 | 1.5 |
| Shield (Scutum) Dura Europos size | 15.18 | 6.9 |
| Javelin (Pilum) Hod Hill pattern. Without lead loading | 2.42 | 1.1 |
| Clothing and shield cover of canvas | 3.0 | 1.3 |
| Total | <u>54.959</u> | <u>24.9</u> |

| <u>Auxiliary 1st century A.D.</u> | lb | kg |
|---|--------------|------------|
| Helmet (cassis) Coolus 'C' | 3.52 | 1.6 |
| Military belt (cingulum militare) Cast plates | 1.10 | 0.5 |
| Pompeii sword scabbard (Gladius et vagina) | 2.86 | 1.3 |
| Shield (Clipeus) Oval type | 7.49 | 3.4 |
| Boots (Caligae) | 3.3 | 1.5 |
| Dagger and scabbard (Pugio et vagina) | 1.54 | 0.7 |
| Clothing | 1.5 | 0.7 |
| Total | <u>21.31</u> | <u>9.7</u> |

No body armour was worn by the Auxiliary

| <u>4th century limitaneus (Frontier soldier)</u> | lb | kg |
|--|----|----|
|--|----|----|



| | | |
|---|-------------|-----------|
| Helmet (cassis) Intercisa pattern | 2.21 | 1.0 |
| Sword, scabbard and baldric (Spatha, vagina et balteus) | 5.72 | 2.6 |
| Military belt. 4th century pattern | 0.40 | 0.2 |
| Shield, based on Dura Europos round/oval pattern | 11.0 | 5.0 |
| Clothing (approx.) | 2.2 | 1.0 |
| Total | <hr/> 21.52 | <hr/> 8.8 |

No body armour was worn by the Limitaneus.

4. GROENMAN-VAN WAATERINGE, 1967.
5. BOWMAN & THOMAS, 1983, No.15.
6. Tacitus Histories III,50.
7. Suetonius Vespasian 8,3.

BIBLIOGRAPHY

- BOWMAN & THOMAS 1983: A.K. Bowman & J. Thomas, Vindolanda: the Latin Writing Tablets, Britannia Monograph Series No.4, (London 1983)
- GROENMAN-VAN WAATERINGE 1967: W. Groenman-van Waateringe, Romeins lederwerk uit Valkenburg Z.H., Nederlandse Oudheden 2, (Groningen 1967)

Pls. I & II The Nijmegen march - these photographs show the method of suspension of helmet and other equipment on the march - this is to be contrasted with the method illustrated on Trajan's Column

APPENDIX: THE ROMAN MILITARY RESEARCH SOCIETY

In 1983 a small group of people came together to form a society for practical experimentation with the arms, armour and equipment of the Roman army. The R.M.R.S. was formed in the realisation that many gaps in our knowledge could be usefully addressed by practical experimentation.

The last three years have been spent in reconstructing items of Roman armour and weapons, in lecturing at home and abroad and in carrying out simple basic tests, these often in conjunction with marching have allowed us to gain an insight into the durability, awkwardness and practicability of reconstructions.

Our kit now encompasses figures from the late Republican army through to fourth century soldiers of the Roman army. These are the subject of our lectures at home and abroad which have been tailored to suit all levels of interest.

The society is in the main based in Northampton and it is here that we have had our greatest success to date with school visits. We can add a useful visual aid for teachers when the children are learning about Roman Britain and our specialised knowledge adds a useful teaching tool to the local education repertoire.

We are a society whose policy, aims and enthusiasm can be endorsed by our close association with the Upper Nene Archaeological Society and Dr. Hubrecht of the Kam Museum Nijmegen. We have cooperated and worked with the Guildhall Museum in Northampton and in our latest major venture in 1986, we returned to Holland and Germany for another lecture tour which coincided with festivals of the Emperor Trajan's birthday.

We do not intend in the above statement about our policy, aims and experiments to mislead anyone into thinking we are the only group or society involved in this line of practical research. The society freely acknowledges the existence of other societies and individuals both here and abroad engaged in similar experiments of a practical nature, this is merely to inform of our existence in an attempt to forge constructive links with like minded workers.