

Dacian Military Equipment and Technology*

Often overlooked by modern authors as a serious threat to the Roman army,¹ the forces of the Dacian king Decebalus posed a genuine concern to Rome. Trajan's reaction to the continued Dacian incursions into Roman territory demonstrates how this threat was perceived. It is the intention of this article to examine Dacian military equipment and technology, and the Roman reaction to the Dacians, to determine how significant a threat the Romans may have thought these opponents posed on the battlefield.

Trajan gathered a huge force and spent immense sums of money to defeat Decebalus, and as a result claimed Dacia as the newest Roman province in AD 106. Although potential glory and

* Many Scenes from Trajan's Column and Adamklissi metopes will be referred to during the course of this article; not all of these scenes have been included. For any further investigation of scenes not depicted the author recommends the work of Frere and Lepper's book *Trajan's Column* with the new series of the Cichorian plates. For the Adamklissi metopes mentioned see Richmond's book *Trajan's Army on Trajan's Column*.

¹ <http://indoeuro.bizland.com/project/chron/chron4.html>;
www.hungary.com/project/chron/chron4.html.

wealth were certainly contributing factors in Trajan's decision to invade, the threat posed to Rome by a reunited Dacia, with a potential force of 250,000 combatants,² undoubtedly outweighed all other considerations. A force of this size led by a king hostile to Rome clearly endangered the Danubian provinces, and any notable successes on Decebalus' part would have further weakened the frontier security of the Empire. Trajan, an experienced military commander who was probably present in both Danubian theatres against the Marcomanni and the Dacians during Domitian's reign, assembled Rome's largest ever army and invested enormous amounts of money into two Dacian wars in an effort to end the Dacian threat.³ Although ultimately victorious, each phase of these wars was hard fought and costly to the Roman army.

² K. Strobel (1984). *Untersuchungen zu den Dakerkriegen Trajans: Studien zur Geschichte des Mittleren und Unteren Donaumaumes in der Hohen Kaiserzeit* (Bonn: Dr Rudolf Habelt GMBH), 58; Strabo writing about the first century BC estimated Dacian strength at 200,000 men, Strabo 7.3.13.

³ J. Bennett (1997). *Trajan Optimus Princeps: A Life and Times* (London: Routledge) 89.

The three main sources of evidence about the nature of the Dacian military equipment and technology are Trajan's Column,⁴ the Adamklissi Monument,⁵ and archaeological remains. Trajan's Column depicts some aspects of the Dacian army that suggest they had adopted some degree of Romanisation. The *congeries armorum* depicted on the pedestal base of Trajan's column is a valuable source, depicting a variety of arms and armour utilised by the Dacians and their allies. However, the 220m long spiral frieze which constitutes the majority of the Column is of limited value in its depictions of the armour and weapons used by both armies which, with two notable exceptions,⁶ have been rendered in a highly conventional manner.⁷ Furthermore, many of the weapons on the Column were originally made of metal and are now lost to

⁴ Still visible in Rome although deteriorating due to environmental and other factors.

⁵ More correctly known as the Tropaeum Traiani, built near the town of Adamklissi in Dobruja.

⁶ The Roman style *aries* used by the Dacians in Scene XXXII, Cast 79, and the Roman *carroballista* used in Scene LXVI, Cast 169.

⁷ D. Williams (1999). *Romans and Barbarians Four Views from the Empire's Edge 1st Century AD* (New York: St. Martin's Press) 185; I.M. Ferris (2000). *Enemies of Rome: Barbarians through Roman Eyes* (Gloucester: Sutton Publishing) 65.

us, leaving an incomplete picture of this aspect of the Dacian forces.⁸

The victory monument at Adamklissi, designed and constructed by soldiers who had fought in these campaigns,⁹ is less conventional in its depictions than the Column, and contributes the bulk of the evidence about Dacian equipment. The archaeological remains are important, but only a limited amount of these have been published. These representations, although by no means exhaustive, do assist the historian in determining the composition, structure, and battlefield capabilities of these forces, a necessity if one is to determine the seriousness of the Dacian wars. It is possible that many more details in relation to these matters were provided in Trajan's account of the Dacian wars and the other lost literary sources.¹⁰

There is evidence to suggest that the Dacians were prolific, as well as proficient, metal workers. Dacia was known to have

⁸ Williams (1999) 182.

⁹ I. Richmond (1982). *Trajan's Army on Trajan's Column* (London: The British School at Rome) 52.

¹⁰ Such as that written by Dio Crysostom.

been resource rich in various metals such as gold, silver, copper and iron.¹¹ It is likely that the Dacians had learnt many of their metal fabrication techniques from the Celtic peoples that had settled in and around the Carpathian regions of Dacia in the early 3rd century BC.¹² Excavations at Sarmizegetusa Regia, the capital,¹³ indicate the extent of Dacian metal-working, with at least two of the numerous terraced areas on which it rested dedicated to the metal trade.¹⁴ The first of these terraces contained eight furnaces and one tonne of iron ore which had been formed into round ‘cakes’.¹⁵ The second of the metal-working terraces was evidently dedicated to the manufacture of iron implements, such as tools and swords; several hundred implements have been found during excavation,¹⁶ including spearheads, axes, daggers and *falces*.¹⁷ Hoddinott states that it is not uncommon to discover

¹¹ Williams (1999) 178.

¹² P. Mackendrick (1975). *The Dacian Stones Speak* (Chapel Hill: University of North Carolina Press) 50.

¹³ This refers to the pre-Roman Dacian capital, not the later Roman provincial capital Sarmizegetusa Ulpia.

¹⁴ R. F. Hoddinott (1981). *The Thracians* (Spain: Thames and Hudson) 150.

¹⁵ *Ibid.*, 151.

¹⁶ G. A. Popescu (ed.) (1997). *I Daci* (Italy: Electra) 269 – 271.

¹⁷ Hoddinott (1981) 151.

evidence of large-scale metalworking in this area.¹⁸ This would suggest that the Dacians had a highly developed metal manufacturing industry, and that they possessed a sufficiently large, skilled workforce from which they could draw artisans capable of arming and armouring a significant percentage of their warriors.

Given these finds, it is likely that the Dacians were very well equipped. Goldsworthy suggests that one of the Roman army's primary military advantages was the result of the quantity of swords they issued.¹⁹ Roman legionaries were all equipped with the *gladius*, unlike the Spanish and Gallic forces where only tribal chieftains could afford such a weapon. Todd, primarily on the basis of grave finds, has determined that only about one tenth of barbarian warriors in this period would have had access to a sword.²⁰ However, in this respect the Romans did not possess an advantage over the Dacian army as is apparent from the images

¹⁸ *Ibid.*, 151.

¹⁹ A.K. Goldsworthy (2000). *Roman Warfare* (London: Cassell) 45.

²⁰ M. Todd (1975). *The Northern Barbarians 100 B.C. – A.D. 300* (London: Hutchinson & Co. Ltd.) 170.

presented on both Trajan's Column and the Adamklissi Monument. A minimalist approach might suggest that the average *Daci Comati* would be equipped with an oval shield similar to that of the Roman auxiliaries,²¹ and possess a melee weapon, be it one of a variety of swords, a *falx*, an axe or most likely a spear.²² However, due to the Dacian iron resources and their ability to work them, it is likely that a far greater percentage of the Dacian soldiers were equipped with effective armour and weapons, than what might be termed the average barbarian.

The weapon most associated with the Dacian forces that fought against Trajan's army during his invasion was the *falx*,²³ a single-edged, scythe-like weapon. The *falx* was able to inflict horrible wounds on opponents, easily disabling or killing even the heavily armoured Roman legionaries faced during this conflict.²⁴ This weapon, more so than any other single factor, forced the

²¹*Daci Comati* were the common Dacian soldiers as opposed to the *Daci Pilleati* who were the cap-wearing nobility.

²²M. Todd (1972). *Everyday Life of the Barbarians: Goths, Franks and Vandals* (New York: Dorset Press) 112 – 119.

²³L. Rossi (1971). *Trajan's Column and the Dacian Wars* (London: Thames and Hudson) 122.

Roman army to adopt previously unused or modified equipment to suit the conditions on the Dacian battlefield in an effort to reduce their potential losses. Clearly these matters demonstrate the profound impact of this weapon and the cautiousness with which the Romans approached the Dacian forces.

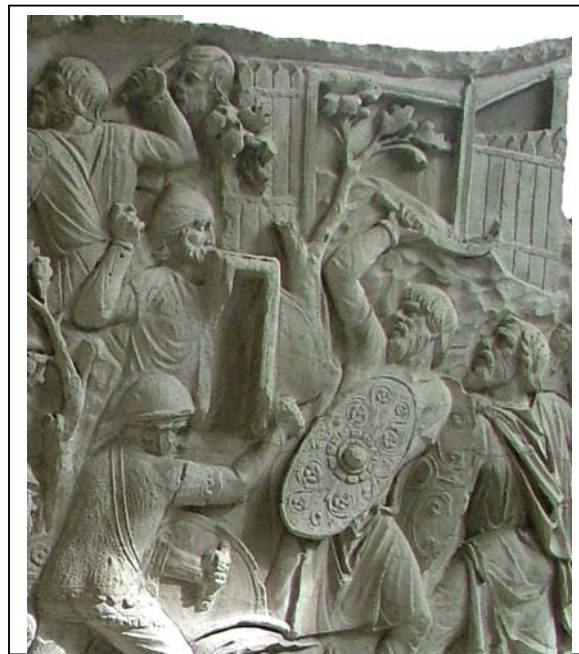


Fig. 1. Trajan's Column Detail Scene LXXII, Cast 187

²⁴ Fronto, 9; Goldsworthy (2000) 221.

There is much disagreement amongst historians regarding what the Dacian *falx* actually looked like.²⁵ Most of this debate centres around the differences in the depictions of this weapon on Trajan's Column and the Adamklissi Monument and the inconclusive and limited nature of the archaeological evidence. The images on Trajan's Column show the *falx* as a short bladed, single-handed weapon used in conjunction with a shield.²⁶ The Adamklissi Monument's depictions differ in several key ways, and four distinct *falx* blade designs are shown.²⁷ Nonetheless, the Adamklissi *falx* can be characterised basically as a large double-handed weapon generally used without a shield.²⁸ Some commentators have described the *falx* depicted on Trajan's Column as a Getan *falx*,²⁹ and have stated that this was the weapon that the Roman army faced whilst invading Dacia. Others prefer

²⁵ Rossi (1971) 122, prefers the Adamklissi *falx*; Richmond (1982) 50 believes that the Dacians used the shorter *falx* as depicted on Trajan's Column.

²⁶ Scene LXXII, Cast 187. See Fig. 1.

²⁷ D. Sim (2000). "The Making and Testing of a Battle Falx also known as the Dacian Battle Scythe", *JRMES*, 11: 38; Adamklissi Metopes XVIII, XX, XXXIV.

²⁸ Metopes XVIII, XX, XXXIV.

²⁹ Richmond (1982) 50.

the Adamklissi *falx* as the weapon used against Trajan's army.³⁰ Proponents of the former theory state that the depictions of the *falx* found on the Adamklissi metopes belong to a different racial group, of Sarmatian stock, living in the vicinity.³¹ Yet, if the Dacian *falx* were the small single-handed weapon depicted on the Column, the modifications that the Romans applied to their armour would have been unnecessary. The momentum and reach of such a weapon would have been insufficient to warrant the expense and trouble of these changes.

When the images of the Dacian *falx* are subjected to scrutiny, and compared with the few archaeological finds,³² it becomes clear that there are two distinct types of *falx*. A socketed *falx*, that possessed a blade that was approximately 30-40 cm in length with a handle approximately one-third longer than the

³⁰ S. Anglim, P.G. Jestice, R.S. Rice, S.M. Rusch, J. Serrati (2002) *Fighting Techniques of the Ancient World; 3000 BC – 500 AD* (London: Green hill Books) 142.

³¹ Even if this could be proven there is no reason to believe that the larger *falx* was not also used by the Dacians.

³² Popescu (1997) 240; 314.

blade,³³ and a tanged *falx* possessing a longer blade, the tanged example on display at the Deva museum measures 68cm in length including the tang (figure 2).



Fig. 2. Tanged and Socket Falx types at the Deva Museum

Although there are no extant *falx* handles, as a result of the organic materials which they were constructed from, however a

³³ A. Pescaru et. al. (2004). *Dacii catalogul Expozitiei*, (Deva: Muzeul

clearer picture of the *falx* can be achieved when the archaeology and pictorial representations are examined together. It is likely that the *falx* could be used as either a one or two-handed weapon, hence with or without a shield. The images of the *falx* on the Adamklissi



Fig. 3. Trajan's Column Detail Scene LXVI, Casts 168-169

monument and the *Daci Pilleatus* pictured on the Column in scene LXVI casts 168-169 highlights this effectively.³⁴ Figure 3 plainly

Civilizației Dacice Și Romane Deva) 97.

³⁴ Rossi (1971) 123.

illustrates that the Dacian weapon has a handle approximately one third longer than the blade, and is clearly of sufficient length to be used in a double-handed fashion, although this plate depicts a bearded Dacian *Pilleatus* wielding the weapon with his right hand only, in an overhead stroke whilst utilising a shield in his left hand.

Fronto describes the gaping wounds that this weapon was known to inflict.³⁵ A recent article by David Sim, in which the author has constructed and tested the Dacian *falx*, goes some way to demonstrating the truth of Fronto's comment. Sim's experiments have shown that the *falx* was capable of inflicting a crippling if not fatal wound to an unprotected opponent.³⁶ Further tests carried out by Sim proved that although armour significantly reduced the severity of the 'wound' created, depending on its location, the damage inflicted would have incapacitated the

³⁵ Fronto 9; cf. Sim (2000) 37-40; Goldsworthy (2000) 127.

³⁶ Sim (2000) 40: Sim's test involved striking *plastina*, a product with properties similar to human flesh; the *falx* delivered 140 – 150 joules of impact energy at a velocity of 20 – 25 metres per second, enough to produce a 'wound' that was 165mm long, 113mm deep and 9mm wide as depicted in his article.

majority of recipients, rendering them unable to continue the fight.³⁷

The Dacian warrior was unquestionably a serious threat to his Roman counterpart. Having been trained by Roman deserters in the Roman art of war,³⁸ the Dacians would have had a better understanding of the Roman soldier's shortcomings. Therefore, it can justifiably be assumed that the typical Dacian attack against their heavily armoured opponents targeted the enemy's helmet, shoulder, leg, or right arm,³⁹ which would project forward of the *scutum* whilst trying to stab his opponent in the abdomen, the stroke that Roman soldiers were trained to utilise whilst in combat.⁴⁰ If the Dacians were able to land such strokes they would inflict the disabling injuries described above.

³⁷ Sim (2000) 40: The armour penetration test was conducted on 1.2mm thick piece of mild steel, the weapon created a 40mm long and 6mm wide laceration and its point projected 38mm beyond the steel.

³⁸ Dio 68.9.5-6: 68.10.3.

³⁹ Metopes XVIII, XX, illustrate the exposed parts of Roman soldiers in combat; A.K. Goldsworthy (1996) *The Roman Army at War 100 BC – AD 200* (Oxford: Clarendon Press) 220.

⁴⁰ Vegetius 1.12.; Goldsworthy (1996) 217.

As mentioned earlier, the *falx* forced the Romans to make various changes to their military equipment. They introduced a previously unused piece of armour, the *manica*,⁴¹ returned to modified forms of the older *lorica hamata* and *lorica squamata* armours especially for this campaign,⁴² and improved the Roman helmet.⁴³ Changes such as these were not undertaken without reason. An examination of Roman military equipment up to this period demonstrates that although armour evolves,⁴⁴ this evolution usually occurred for a specific purpose, and this can explain the modifications made to the helmet. Moreover, at no previous time was a new item of protective gear widely employed and then discarded as was the case with the *manica*.⁴⁵ Therefore, these Roman defensive modifications, together with evidence from Trajan's Column and the Adamklissi Monument, help to illustrate

⁴¹ Metopes XVIII, XX; R. H. Robinson (1975). *The Armour of Imperial Rome* (London: Scribner) 186.

⁴² *Ibid.*, 170; Metopes XVIII, XX, XXXI.

⁴³ Metope XX.

⁴⁴ Anglim (2002) 65.

⁴⁵ There are some individual find of *manicae* which indicate that the armour was used in other military engagements but there is no evidence to suggest that its use was as widespread as it was during the Dacian wars, c.f. M.C. Bishop (2002) *Lorica Segmentata* vol.1. (Great Britain: The Armatura Press) 68-69.

the fact that Trajan's victory was not as straightforward as the Column's depictions may suggest, and that conditions on the Dacian battlefield required Roman innovation to reduce their potential casualties.⁴⁶

An examination of the sequence of scenes on the Column which depict the Dacian counter-attack, XXXI – XLI, reveals a number of features that elucidate the nature of the Dacian army and its capabilities. Trajan's departure from his winter quarters clearly illustrates that the Dacian counter-offensive in Moesia was not a trivial matter that could be handled by locally-based troops and their respective commanders. In his monograph *Warfare in Roman Europe AD 350-425* Elton states that in the majority of cases, even as late as the 5th century AD, barbarian attacks in general against well-constructed Roman fortifications were unlikely to succeed.⁴⁷ Elton further states that in most attacks of this kind the barbarians did not even make it past the outer

⁴⁶ C.M. Gilliver (1999). *The Roman Art of War* (United Kingdom: Tempus) 18.

⁴⁷ H. Elton (1997) *Warfare in Roman Europe AD 350 – 425* (Oxford: Clarendon Press) 261; cf. Dio 56.22; Todd (1975) 178.

defences of the fortification in question.⁴⁸ However, Scene XXXII on the Column depicting the Dacian counter-offensive shows the Dacian forces after they have already bypassed or destroyed these outer-defences and are actively engaged in trying to gain entry by means of a battering ram. Also depicted are Dacian archers attempting to render the use of the fortification's wall unsafe whilst they are attacking the wall with the battering ram.⁴⁹ Elton attributes this tactic to Roman siege practices.⁵⁰ This would indicate that the Dacian army had been trained in and had adopted at least some elements of the Roman art of war.

The Dacian soldier was relatively versatile, able to fulfil a variety of battlefield roles and less reliant on specialist forces to be effective in certain environments. The Roman army employed significant numbers of foreign 'specialists' to add balance their army's composition. The Romans are known to have utilised oriental archers,⁵¹ German club-wielding infantry,⁵² and Moorish

⁴⁸ Elton (1997) 261.

⁴⁹ Scene XXXII, Cast 79.

⁵⁰ Elton (1997) 259.

⁵¹ Scene XXIV, Cast 59.

cavalry,⁵³ as well as many others. The Dacian army, although accepting specialty troops such as the Sarmatian cavalry, and Roman siege engineers, was an inherently more flexible force. The *falx*, albeit the weapon most commonly associated with the Dacian forces, was by no means the only weapon the Dacians had at their disposal, as is clearly illustrated on the base of Trajan's Column. The *congeries armorum* depicted on the base of Trajan's Column displays the wide variety of weaponry including axes, composite bows, straight-edged La Tène style swords,⁵⁴ and spears which the Dacians and their allies used. Furthermore, archaeological finds confirm the variety of weapons depicted here.⁵⁵

The Dacian army was far more advanced technologically than any other barbarian army against which the Romans had previously fought. Scene XXV, Cast 63 on Trajan's Column shows Trajan examining a Dacian bow and arrow.⁵⁶ Only the arrow

⁵² Scene XXIV, Cast 59.

⁵³ Scene XXIV, Cast 58.

⁵⁴ Rossi (1971) 124-125.

⁵⁵ Popescu (1997) 159 – 160.

⁵⁶ F. Lepper, and S. Frere (1988). *Trajan's Column* (Gloucester: Alan Sutton) 272.

remains, with the bow which would have originally been made of metal and in Trajan's right hand missing. Yet the bow was clearly of some interest to the Emperor, and hence unlikely to have been an ordinary composite bow similar to the ones used by the Roman auxiliaries and which are regularly depicted being used by the Dacians.⁵⁷ One suggestion based on the previous scene is that it may have been a *Gastrophetes*, an early type of crossbow.⁵⁸ The preceding scene depicts a Dacian, amidst a stand of trees holding an arrow. The bow, like the following panel, is missing.⁵⁹ The grip that this Dacian employs is particularly uncharacteristic of an archer utilising a normal bow. Lepper and Frere suggest that the missing weapon like that missing from the emperor's hands, was a crossbow of some type, most likely the *Gastrophetes*.

The Dacian use of armour is another contentious issue. Some authors seem to believe that the Dacian forces wore no armour at all, as they are depicted on the Column, relying only on the oval shield. These shields, identical to those carried by the

⁵⁷ Scene XXXII, Casts 77 – 79; Rossi, 1971, pp.124 – 125.

Roman auxiliaries, only differed in the designs portrayed on their facade.⁶⁰ Rossi has suggested that the lack of armour in the Column's scenes could be the result of the artist's attempt to ensure the Dacians were clearly distinguishable from the Roman auxiliaries. In support of this interpretation the highly stylised nature of the Column's depictions of the Dacian forces as a barbaric peoples must be reiterated.⁶¹ It is obvious from an examination of the Adamklissi Metopes and importantly the base of Trajan's Column itself that armour was worn by the native Dacian forces and by some of their allies, most notably the Sarmatian cataphract.⁶² The Adamklissi Metopes also seem, under close examination, to depict some of the Dacians as wearing helmets.⁶³ The *congeries armorum* of Trajan's Column illustrates scale armour, mail armour and helmets.⁶⁴ Although it is impossible

⁵⁸ Lepper and Frere (1988) 272.

⁵⁹ Scene XXIV, Cast 61.

⁶⁰ Dacian shield Scenes XXIV, Casts 60 – 61, XXXI; Roman shield Scenes XXIV, Cast 58, XXXII; Rossi (1971) 121.

⁶¹ Lepper and Frere (1988) 272.

⁶² Rossi (1971) 122.

⁶³ Metopes XVIII, XX, XXXIV, XXXV.

⁶⁴ Rossi (1971) 122.

to say exactly how widespread the use of armour was amongst the Dacian army, I believe that it can be safely assumed that at the very least tribal leaders and the wealthy had access to quality metal armour,⁶⁵ although this could be well underestimating the equipment of the average Dacian soldier. It is evident that from the time of Burebista's reign in the first century BC the Dacian forces had undergone some degree of Romanisation.⁶⁶ Williams goes further, stating that the Dacian army of Decebalus' period was a professional force.⁶⁷ If this were proven to be correct then the possibility must be considered that the Dacian forces were far better equipped than the sources, biased in favour of the Romans, lead us to believe.

The Dacian offensive potential made it necessary for the Roman forces to adopt new and to re-introduce modified protective equipment. The Roman army as it is depicted on Trajan's Column is very different from how it would actually have appeared on the

⁶⁵ Todd (1972) 109 – 112.

⁶⁶ P.J.E. Davies (2000). *Death of the Emperor: Roman Imperial Funerary Monuments from Augustus to Marcus Aurelius* (London, Cambridge University Press) 88.

battlefield.⁶⁸ The Column, as it does with the Dacians, presents the Roman army in an extremely conventional manner.⁶⁹ All Roman legionaries are depicted as armoured in *lorica segmentata*, the latest innovation in Roman armour.⁷⁰ Conversely, the Adamklissi monument offers a far more realistic depiction of the Roman forces.⁷¹ The Romans on the Adamklissi Monument wear several different types of armour, ranging from the *lorica segmentata* to the older *lorica hamata* and *lorica squamata*.⁷² These older armour types were adopted in order to minimise the effect of the *falx*. Both of these older varieties of armour were more flexible and able to distribute the impact damage more widely than the newer, more rigid *lorica segmentata*, constructed of plates encircling the soldier's torso.

The rigidity of the *lorica segmentata* made it a liability against the Dacian *falx*. Due to this rigidity the *falx* was more

⁶⁷ Williams (1999) 179.

⁶⁸ *ibid.*, 185; Goldsworthy (2000) 126.

⁶⁹ Williams (1999) 185.

⁷⁰ Rossi (1971) 122.

⁷¹ Williams (1999) 185; Goldsworthy (2000) 126.

⁷² Robinson (1975) 170.

easily able to puncture the armour and thereby more likely to inflict incapacitating wounds to its wearer. The more flexible armours, *lorica hamata* and *lorica squamata*, were less likely to allow the point of the weapon to puncture them and additionally acted to spread the impact damage received, although to prevent serious injury a heavily padded vestment would need to have been worn beneath the armour.⁷³ Moreover, these suits of armour also displayed unique modifications. The Adamklissi Metopes depict *lorica hamata* and *lorica squamata* both lengthened, using a single row of *pteruges* at the sleeves and a double row below the skirt to protect the upper thigh region of the legionary.⁷⁴

Furthermore, the Adamklissi Monument gives a clear indication of other changes adopted by the Roman forces in an effort to deal with the Dacian military and its unique weapon, the *falx*. Clearly visible on the Monument is the gladiatorial *manica*,

⁷³ A.K. Goldsworthy (2003) *The Complete Roman Army* (London: Thames and Hudson) 129, makes it clear that this was common practice.

⁷⁴ Robinson (1975) 170. These modifications are the clearest evidence that these suits of armour were not just remnants of previous eras but re-introduced especially for these wars.

which had previously been used exclusively in the arena.⁷⁵ The *manica*, as pictured on the Adamklissi Metopes,⁷⁶ was a metal sheath of over-lapping bands strapped to the legionary's sword arm. This item had never previously, nor was ever again, widely employed as a part of the legionary's protective equipment. The *manica* was employed because, even though a *falx* wound to the arm may not have resulted in fatality, it would undoubtedly have resulted in the disabling of the legionary struck. The fact that he was injured on the battlefield probably would have made him more of a hindrance, both psychologically and physically, to his own forces.

The Roman legionary helmet of this period also clearly differs from previous models. The modified Roman legionary helmet is depicted on the Adamklissi Monument with a well-defined reinforcing cross-brace,⁷⁷ originating from a field modification intended to prevent the Dacian *falx* from puncturing

⁷⁵ E. Köhne and C. Ewigleben (eds.) (2000) *Gladiators and Caesars* (London: British Museum Press) 47.

⁷⁶ Metopes XVIII, XX, XXXV.

⁷⁷ Metopes XX.

the helmet and inflicting a serious injury. At that time, head wounds were the most likely to result in a fatality.⁷⁸ A further modification to the armour of the Roman legionary fighting in Dacia was the re-adoption of greaves to protect the lower leg from disabling *falx* injuries. Unlike any opponent the Romans had faced before, the Dacians and their *falx* compelled the Roman army to radically change the way that their soldiers were equipped.

The quality of the Dacian fortifications were another threat to Rome's invasion forces. The depictions of the Roman army besieging Dacian fortifications provide evidence of the quality of the Dacian defence works. Some of these installations served the dual purpose of fortified settlements: Costești, Bănița, Căpîlna and Sarmizegetusa. Others served a purely military function and show no signs of civilian activity: Blidaru, Piatra Roșie, and the wall from Cioclovina to Ponorici.⁷⁹ Trajan's Column clearly shows that these defensive installations varied considerably in their methods of construction; they display Hellenistic, Latin and uniquely

⁷⁸ Goldsworthy (1997) 220.

Dacian influences.⁸⁰ These differences are confirmed by archaeological surveys of the extant remains.⁸¹ Several distinct wall types were used throughout this period (1st century BC to the 1st century AD), predominantly the *Murus Gallicus* and the *Murus Dacicus*. Gallic walls, as depicted on Trajan's Column in Scene CXIV, were constructed around scaffolding made from wooden beams that were nailed together. These were covered with inner and outer fascias of unworked stone and the intervening space was then filled with *emplekton*.⁸² Caesar described the Gallic wall as impervious to battering rams due to the shock-absorbing properties of the wooden scaffolding.⁸³

The Dacian wall, however, was constructed differently. It consisted of unmortared inner and outer fascias of worked stone blocks.⁸⁴ The space between the two fascias of the Dacian walls,

⁷⁹ I. Glodariu, *Dacian fortresses from the area of Sarmizegetusa*, <http://archweb.cimec.ro/arheologie/sarmi/1eng.htm>.

⁸⁰ Lepper and Frere (1988) 270-271.

⁸¹ Glodariu, op. cit., <http://archweb.cimec.ro/arheologie/sarmi/2eng.htm>.

⁸² P. Connolly (1988). *Greece and Rome at War* (London: MacDonal & Co Ltd) 294.

⁸³ Caesar, *Gallic War* 7.23.

⁸⁴ C. Daicovicu (1977) "Dakien und Rom in der Prinzipatszeit", *ANRW*, vol. 2, pt. 6. (Berlin: Walter De Gruyter) 891.

which were often built to a height of three to four metres, was filled with *emplekton* like the Gallic wall.⁸⁵ Since unmortared fascias of this type could be forced apart by the weight of the *emplekton*, the Dacians carved a dovetail joint into the blocks of stone and the ends of stout wooden beams which were then used to connect the inner and outer fascia walls at regular intervals. This had a distinct advantage over the Gallic design, in that the ends of the beams did not project beyond the stonework and could not be set alight by a besieging force.

Many of these fortifications were designed to withstand prolonged siege operations. To this end they possessed their own rainwater tanks and displayed many of the defensive features associated with permanent Roman fortresses of the time, such as ditches bridged only at the gateway, and *cippi* and *lilia* (cavalry traps) covering the approaches.⁸⁶ Trajan's army was forced into undertaking active siege operations against these fortresses as any attempt to starve the occupants into submission would likely have

⁸⁵ Daicoviciu (1977) 891.

forced the Roman army to winter in the Carpathians, an extremely hazardous prospect.⁸⁷ Bypassing these fortresses was not an option, as any attack against Sarmizegetusa with intact fortresses behind them would certainly have resulted in the Roman force being attacked from multiple fronts. The Dacian strategy relied heavily on these fortresses. Without them Decebalus could not have withdrawn from the lowland areas during the first Roman incursion. Furthermore, they contributed to the choice of Tapae as the site of the only depicted battle in the first campaign.

Of particular interest is the Dacian use of *Carroballistae* depicted on Trajan's Column in Scene LXVI, Cast 169 to defend the walls of a Dacian fortress against Roman assault. The *Carroballistae* are depicted on several occasions being used by the Roman forces. Their use by the Dacians further highlights the degree of Romanisation in the Dacian army and the sophisticated level of the technology in use by this 'barbarian' army. These weapons most likely came into Dacian possession through the

⁸⁶ Scene XXV, Cast 63; Richmond (1982) 40.

technicians Decebalus had received from Domitian or those salvaged after Fuscus' defeat.⁸⁸

Although Trajan's Column can easily be interpreted as depicting the Dacian wars as a relatively easy victory for Trajan's forces, the reality was quite the opposite. The potential dangers that the Romans faced every time they came into contact with the Dacians is highlighted by the fact that they were required to change and enhance the armour worn by their legionaries, in order to reduce the number of casualties inflicted upon them in battle. To defeat the Dacian army and be in a position to claim Dacia as a province, the Romans needed to defeat an army substantially more diverse, Romanised and professionally equipped than is depicted either on Trajan's Column or in the literary account of Dio. The Romans were forced to storm several extremely well-defended fortifications, technologically the equivalent of those produced by the Romans and more advanced than anything else in Europe at the time.

⁸⁷ Williams (1999) 182.

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⁸⁸ Rossi (1971) 125.