The Roman Art of War: Theory and Practice

A Study of the Roman Military Writers

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ABSTRACT

This thesis is a comparative study of the theory and practices of Roman warfare. The content of the various treatises, both extant and lost, is described, along with a discussion of the ancient traditions of textbook composition, their role in education and their possible practical use. The following chapters consider various aspects of Roman warfare for which sufficient historical and archaeological evidence exists and which are dealt with fully in the treatises. The size and internal organization of the different units of the Roman army are discussed with particular reference to the de munitionibus castrorum and Vegetius; a discussion of marching camps follows which considers the origins of these camps and an estimation at the density of soldiers per acre through the application of the rules of the de munitionibus castrorum to examples in Britain. The practices of the Roman army in the field are dealt with in the next three chapters: the order of march, pitched battles, and siege warfare. The first of these includes a discussion of Arrian's order of march and the relationship between the order of march and the line of battle whilst that on pitched battles considers the role of auxiliaries in the battles of the early Empire and the suggested reintroduction of the Greek style phalanx in the second century AD. The development of siege techniques, both offensive and defensive, is discussed, and this is followed by an analysis of the "rules of war". Although it is difficult to argue how much influence the treatises may have had on actual practices, the thesis illustrates the very close correlation between the treatises and actual field practices of the Roman army and shows that some of the treatises were of practical value.

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Chapter 1: Introduction

"Si vis pacem, para bellum"

Latin proverb.

The subject of the Roman army has had a fascination for people from the time of Polybius, who was interested "by what means...the Romans succeeded in less than 53 years in bringing under their rule almost the whole of the inhabited world" (I 1). The army was also of interest to the Romans themselves, evidenced by the number of treatises produced concerning the military system and its operations in the field. The success of the Roman military system led many later generals and military theorists to look for inspiration from this time; Charlemagne required all his generals to read Vegetius, and Machiavelli based his Arte della Guerra on this treatise. Translations of Roman military writers were produced during the Napoleonic wars and as late as World War II, and it is these treatises that are the principal topic of this thesis.

Apart from an introductory article on the subject (Campbell 1987), there has been no comprehensive study of Roman military handbooks, or of the workings of the army in the field from the point of view of, and with particular reference to, these treatises. Historians have had a tendency to quote the Roman military theorists when the evidence suited their arguments, but without considering the context of the quotation or the nature of the source. Most of the time the treatises seem to be ignored or dismissed, yet taken together they form a fairly large corpus of information on military theory.

This thesis will attempt to remedy this situation and bring the treatises out from their position of comparative obscurity. This will be done through analysis and comparison of the information contained in the treatises on particular aspects of warfare with reference to other literary sources and archaeological evidence. The thesis will attempt to evaluate how realistic the treatises are in the advice they give and whether there is any evidence of the influence of the treatises, and military theory, on the field practices of the Roman army.

I believe it is essential to study all aspects of the ancient world within the context of all available information, whether it is archaeological, epigraphical or literary, and so this thesis does not deal exclusively with one type of evidence; it is not an 'archaeological' thesis but one that, I hope, approaches the study of Roman warfare making full use of all the varieties of evidence that are available.

Chapter 1 will consider the treatises themselves, both extant and lost, and the range of information they contain. This will be followed by a discussion of the categories of treatises, the declared aims of the authors, and other uses they might have. The role of textbooks in Roman education will be examined briefly, and how the different categories of military treatises might fulfil this role. The ensuing chapters will then consider selected topics individually that the treatises cover in some detail and for which sufficient evidence is available for constructive comparison between the theory and advice in the treatises and the recorded field practices. Since it would not be possible to cover all aspects of Roman field practices within the thesis, the principal elements of campaigning, which are dealt with more fully in the treatises, have been

chosen for discussion whilst others which the treatises only consider briefly, such as logistics and foraging, have been omitted.

The first of these will cover the somewhat controversial subject of the size and organization of army units and will make particular use of the de munitionibus castrorum and the antiqua legio of Vegetius, along with epigraphic, papyrological and archaeological evidence, and a translation of the de munitionibus castrorum is included as Appendix 1.

The de munitionibus castrorum is also the principal treatise used in the third chapter, on camps. The origins of the Roman marching camp will be discussed here, as will the defences of marching camps and their sites, and in the latter case a clear comparison will be seen between the advice of the treatises and actual practice. The size of marching camps will be considered with reference to the precepts of the de munitionibus castrorum and the archaeological remains in Britain, which has important implications concerning the density of troops in marching camps and, therefore, the size of field armies on campaign in Britain.

The order of march and pitched battles are the subjects of the following two chapters, both with particular reference to Arrian's Ἔκταξις κατ' Ἀλανων, and the question of deploying from line of march to line of battle. A short catalogue of major pitched battles of the late Republic and early Empire is included as Appendix 2. The second of these chapters also addresses two problems arising from accounts of battles during the late 1st and early 2nd centuries AD; the use of auxiliaries as the main striking force in the light of Tacitus' famous comment about preserving the lives of citizen legionaries at Mons Graupius (Agric.35), and the suggestion that the battle line reverted to

a phalangic formation during this period. An attempt will be made to explain these issues and show that they do not represent major changes in Roman military thought or practice.

Chapter 6 discusses the attitude of the treatises towards siege warfare, and why the theorists provide less practical advice on this than on other subjects. Appendix 3 contains precis of sieges mentioned in the text using both literary and archaeological sources, but the catalogue is selective and makes no attempt to provide an exhaustive survey of all Roman sieges during the period under study. The final chapter, on morality, considers accepted modes of conduct on the part of Roman armies, particularly commanders, and this draws on the more philosophical writers such as Onasander, as well as on other authors like Cicero and Seneca. Most of the advice and evidence on this subject relates to siege warfare so the discussion will again make reference to the examples contained in Appendix 3.

Each of these chapters could be the subject of a thesis in its own right and so the various topics are discussed primarily in the light of the contents of the treatises. Chapter 5 on pitched battles, for example, does not discuss the actual fighting of battles since the treatises only deal with deployment, reserves and retreat or pursuit. This is especially the case with chapter 6 on siege warfare; many of the contrivances usually associated with Roman sieges, such as circumvallations, siege ramps etc. are barely touched upon by the treatise writers, so they are only considered briefly.

In conclusion, this thesis will illustrate and discuss the strong correlations between the advice given in the treatises and field practices. There is evidence to suggest that manuals were available to assist those directing field

operations, and that under certain circumstances they might be used, along with personal experience and the advice of experienced officers, to assist the commander in making some of his decisions.

Chapter 2: The Literary Evidence

Information concerning the activities of the Roman army in the field can be obtained from a number of literary sources, in particular histories, commentaries and military treatises. This chapter will consider the first two types of sources briefly after a description of known treatises dating to the Roman period and a discussion of the purposes behind their compilation. The treatises are considered in approximate order of their production.

The Treatises

Cato the Elder - de Re Militari, or de Disciplina Militari (Veg.I 15). Possibly the first Roman to compile a military treatise. 15 fragments survive. Astin (1978 185) suggests that the treatise included information on the taking of auspices, methods of maintaining discipline, unit organization, march and battle formations and the uses of specialist troops. He suggests that examples were used to illustrate the points made. Frontinus quotes Cato (Strat.IV i 10), and Vegetius lists him as one of his sources (I 8). Cato also wrote a treatise de Agri Cultura.

Asclepiodotus - Τεχνη Τακτικη[1]. A Greek philosopher and pupil of Posidonius (Seneca Nat.Quaest.II 26 6), writing in the 1st century BC. The earliest surviving military treatise of the Roman period, Asclepiodotus' work is a detailed description of the Greek phalanx and its tactics, including sections on the disposition of light troops and cavalry, and the use of chariots and elephants in warfare.

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[1]It should be noted that although breathings are included in Greek texts, accents are not.

Cincius Alimentus - de Re Militari. The work, cited by Aulus Gellius, is probably that of the constitutional antiquarian writing at about the time of Augustus. The treatise was at least six books long, with the third including declarations of war, the fifth the levying of troops and the sixth the organization of army units.

Vitruvius - de Architectura. Architect working under Augustus who wrote a treatise on architecture. During the civil wars he had served as a military engineer and worked with artillery in particular (de Arch.Pref.). Book ten, on mechanics, includes a detailed description of various artillery pieces.

Athenaeus Mechanicus - περι μηχανηματων. Probably a contemporary of Vitruvius. His treatise is very similar to Vitruvius' section on military engines. Both Athenaeus and Vitruvius probably based their works on that of Aegesistratus whom they mention as a source (Athen.Mech.7 6; Vit.de Arch vii Pref.14).

Cornelius Celsus - Title unknown; cited by Vegetius (I 8). Writing an encyclopedia at the time of Tiberius of which the military treatise was a part; only fragments of his de Compositione Medicamentorum survive, though Schenk (1930) believed the military treatise was a general one based on Cato.

The Elder Pliny - de iaculatione equestri, written whilst he was prefect of an ala in Germany (Pliny Ep.III 5), probably under Claudius. Pliny quotes the work briefly in the Natural History, and it included advice on the best type of horse and ways in which a trained horse could assist the rider in battle (NH VIII 159, 162).

Onasander - Στρατηγικος. A Greek philosopher who wrote a treatise on generalship dedicated to Quintus Veranius, probably the same man who was consul in AD 49 and died whilst governor of Britain in c.AD 58 (Annals xiv 29; Agric.14; AE 1953 251). The treatise is rather different to other surviving works as it lays great emphasis on the moral qualities and other abilities which the author considered a general should possess. The author then gives advice on how the general should conduct himself and proceed in a variety of situations, very often giving fairly general guidelines rather than laying down strict instructions for each situation as Vegetius does.

Frontinus - Strategemata. The only surviving military work in Latin from the early Empire to have survived. The author, Sextus Julius Frontinus, held the consulship three times, was governor of Britain, and Curator Aquarum in Rome. He seems to have been a keen author of handbooks, producing works on the art of war (de Scientia Militari, or de Officio Militari according to Lydus (de Mag.I 47)), on the aqueducts of Rome (de Aquis), and surveying (treatises in the manuscript collections of the Agrimensores are ascribed to Frontinus). The de Aquis was written to help him and his successors understand the administration of Rome's water supply (de Aquis Pref.), and his military works, unlike those of the Greek philosophers, were written by an expert.

Frontinus claims to be the only man interested in military science to have reduced its rules to a system (Strat I Pref.), and he considered his Strategemata to be completing the task begun by his treatise on warfare. According to Vegetius (II 3), the work was very highly thought of by Trajan, and Lydus claims it included information on siege machinery as well as on strategy (de Mag.I 47). However, Frontinus himself did not include the subject of siege machinery in the Strategemata because he believed that the

development of machines and engines for siege warfare had long since reached its limit (Strat III Pref.).

The Strategemata comprised four books with over 400 examples of military stratagems mostly taken from historians and referring to the classical Greek, Hellenistic and Roman periods. Each book covers a particular topic; preparations for battle (book 1); battles, ambushes and retreats (book 2); sieges (book 3); general topics including discipline, justice and sayings (book 4).

de Munitionibus Castrorum. Author and date disputed. Ascribed to Hyginus Gromaticus because the text survives as part of a manuscript of treatises on land surveying. Probably written by a military surveyor in the late 1st century - early 2nd century AD (for arguments on date of DMC, see chapter 2). A detailed work explaining a new method of organization for temporary camps, and some information on camp defences.

Aelian - Τακτικη Θεωρια. A Greek philosopher and contemporary of Frontinus who dedicated his work to an emperor, probably Trajan. Aelian's treatise, like that of Asclepiodotus, was a description of the workings of the Greek phalanx.

Heron of Alexandria - Βελοποιικα; Χειροβαλιστρα. Greek artillery technician writing in the late 1st or early 2nd century AD. Βελοποιικα is based on a 3rd century BC work by Ctesibius and therefore reflects earlier usages (Marsden 1971 1-2), but the Χειροβαλιστρα includes recent developments.

Apollodorus of Damascus - Πολιορκετικα. An architect working during the reigns of Trajan and Hadrian, Apollodorus was the designer of Trajan's bridge over the Danube and Trajan's Forum. He was exiled in AD 129 and later executed by Hadrian (Dio Epit.lxix 4), supposedly for criticizing the emperor's designs for the Temple of Venus and Rome. He wrote a book on siege machinery dedicated to Hadrian which describes a variety of equipment needed for assaulting a stronghold. He does not, however, deal with the defence of strongholds.

Arrian - Τεχνη Τακτικη (Tactica), Ἐκταξις κατ Αλανων. Arrian was a Greek senator who was governor of Cappadocia under Hadrian. He wrote three military works, two of which survive, the Tactica and the Ἐκταξις. The first of these was dedicated to Hadrian in AD 137 and was a treatise primarily about the Greek phalanx, similar to that of Asclepiodotus and Aelian above. Arrian made some attempt to make his treatise more up to date by including references to contemporary practices, such as the British chariotry. The last section of the Tactica is a description of the hippica gymnasia, exercises carried out by the Roman cavalry. Stadter (1978 118) illustrates the very close similarities between the texts of Aelian and Arrian, and it is generally accepted that the two writers were using a common source, and that both they and Asclepiodotus were using manuscripts that ultimately descended from Posidonius.

The Ἐκταξις probably dates to c.AD 132 when Arrian was governor of Cappadocia. It describes his proposed order or march, battle line and battle plans for dealing with a threatened Alan invasion. This is the only document of its kind dating to the Roman period and the most detailed description of an army dating to the early Empire.

Polyaenus - Στρατεγεματα. Written by a philosopher and dedicated to Marcus Aurelius and Lucius Verus in c.AD 162. It is similar to Frontinus' work, containing eight books of examples taken from different periods and including the exploits of gods and mythical heroes. The examples are not arranged by subject matter like those of Frontinus but each book contains a seemingly random selection of stratagems, some appearing to be simple anecdotes whilst others provide useful precedents.

Tarruntenus Paternus - de Re Militari or de Re Militarium. Legal expert and probably the Praetorian Prefect under Commodus who was executed for treason (Dio lxxii 5), described by Vegetius as diligentissimus iuris militaris adsertor (I 8). The treatise dated to the time of Marcus Aurelius or Commodus. Schenk (1930) believed that it was largely based on the Constitutiones of Hadrian and that Vegetius made extensive use of Paternus in his second book on the organization of the legion. Little is known of the actual contents, though, except that it illustrated the author's knowledge of the law; his definition of immunes in the army and list of examples was included in Justinian's Digest (50 6 7).

The Emperor Julian (?) - Μηχανικοι. On siege machinery. The reading of the name in the text is not generally accepted (Bandy 1983 282 n.74), but Ammianus states that Julian built a helepolis during the siege of Pirisabora in AD 363 (Ammianus xxiv 2) and I see no reason to dismiss the possibility that the emperor did indeed write such a treatise.

Vegetius - de Re Militari, or Epitoma de Militari. Written probably in the late 4th century, this is the only manual on Roman military institutions to have survived. Vegetius made extensive use of earlier writers whom he lists at one

point (II 3). The treatise is divided into four books; on recruitment and training; on the organization of the legion; on the order of march and of battle; on siege and naval warfare. Vegetius can be problematic as a source because it is often difficult to determine to which period the information he is using belongs.

The Role of Treatises

Campbell (1987) notes that there was a tradition of practical military handbooks from at least the late Classical period which continued in the Roman period together with a series of textbooks on a wide range of subjects including agriculture and architecture. He outlines the part played by manuals on various subjects in the Roman education system, quoting evidence from Cicero that military knowledge could be acquired from textbooks as well as from practical experience (Cic.Pro Fonteio 42; Pro Balbo 47; Lucullus 1 1-2), and I do not intend to repeat his discussion here. He does conclude that military manuals may have been of some use for prospective generals but suggests that there is a difference between the military treatises and those on other subjects:

> "Apart from Frontinus and Arrian, the writers of military handbooks, unlike most of the agricultural writers, had no experience of what they wrote about. Furthermore, advice on farming procedure could perhaps be more directly helpful to a farm owner than examples of stratagems to an army commander."
> (1987 19)

There are, however, problems with both these statements. Campbell's article does not discuss treatises which are no longer extant or exist only in fragmentary form, or the artillery manuals. Once these are included in a discussion of practical experience, though, the situation changes somewhat. 18 treatises are described above, and with the exception of Cincius Alimentus and Cornelius Celsus, for whom insufficient evidence is available, the only authors of military handbooks without the relevant practical experience are

Asclepiodotus, Onasander, Aelian, Polyaenus and Vegetius. Those without experience, therefore, were primarily Greek philosophers following (very closely in some cases) a strong literary and philosophical tradition that was Greek in origin (see below p.20). The claim in many of the treatises to be giving practical advice may be part of a literary topos, as Campbell suggests (1987 19), but in most cases it would appear to be justified.

The importance of past examples of how to do something, and how not to, has always played a part in education. The study of past campaigns, both successful and unsuccessful, can help the aspiring general to formulate his own plans and strategies and the study of military history is still part of a modern officer's training[2]. Polybius states that books of examples played an important part in the education of officers and generals, along with manuals written by experts and personal experience (xi 8 1), and Frontinus' Strategemata were written for this first purpose (Strat.I Pref.).

However, the instruction of young officers in the art of generalship was not the only reason for the compilation of the military treatises. Spaulding points out that Homer was considered to be a military authority and that later philosophers "felt that to make good their claim to universality for their doctrines, they must treat the military art" (1933 657-669)[3]. This statement would help to explain the treatises of the Greek philosophers who had no

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[2]eg: Sandhurst & West Point include courses in military history and the Russian military academies place particular emphasis on the study of campaigns of the Second World War. I am grateful to Mr Oliver Gilkes for this information. An example of how this such knowledge could be applied occurred in the Gulf War when General "Stormin'" Norman Schwarzkopf claimed his classic pincer movement against the Iraqi army was based on the tactics of Hannibal at Cannae.

[3]Both Arrian (Tact.31 5) and Vegetius (I 5) quote Homer as an expert on military affairs.

experience of military affairs, but were also eager to remind their audiences of the glories of Greece's past (Campbell 1987 19). Onasander seems to have written his treatise with the genuine intention of honouring his Roman patron while Asclepiodotus, Aelian and Arrian are all following in the tradition of earlier Greek philosophers who wrote on the Greek phalanx.

The 'Greek phalanx' treatise seems to have been part of a literary genre that does not include the other military treatises. Both Aelian and Arrian claim to be writing the work to remedy the obscurity of previous treatises which were written for those already knowledgeable (Aelian 1 3; Arrian Tact.1 2), but are of the same level of technicality as that of Asclepiodotus. Heron makes the same claim for his treatise on artillery (Βελοποιικα Pref.). A clearly written treatise on the construction and use of artillery would no doubt have been very useful for the education of and use by military engineers, but it would hardly make any difference to the use of treatises on phalanx tactics because it is so difficult to see much potential use for them anyway.

Perhaps not surprisingly, Aelian doubted the value of his work, but claims to have been encouraged by a visit to Frontinus and states:

> "So I ceased to hesitate about writing on military tactics. For I thought that Frontinus would hardly be enthusiastic about such a work if he believed that it lagged behind Roman military practice"
>
> (Aelian Pref.3)

Campbell suggested that Frontinus' interest "may suggest that there was some practical benefit to be derived from it" (1987 17). However, it seems more likely that Frontinus encouraged Aelian because he was himself an antiquarian, "no less interested in the military principles of the Greeks" (than

those of the Romans; Aelian Pref.3),and these interests are illustrated in his Strategemata[4]. Later, Aelian states:

> "As to the mode of drawing up chariots and elephants in order of battle, although we find them to be of little use, yet lest this treatise should seem deficient, we will add the terms used by those writers who prec eded us." (Aelian 27.1)

Thus Aelian includes information on chariot and elephant warfare which he knows is useless. Arrian at least made some effort to make his treatise more relevant by including contemporary references to enemies of Rome and Roman tactics against heavy cavalry, the British chariotry, and finishing with his description of Roman cavalry exercises (Tact.4 7; 11 1-2; 33 ff.). The evidence from both treatises, and Aelian's in particular, suggests that their work is more of a philosophical and literary exercise than a serious attempt to provide a practical military handbook.

Heron, on the other hand, does seem to have provided what he promised; a specialist treatise on artillery that was accessible to non-experts, whether soldiers or civilians. Marsden states that a layman could gain "an excellent understanding of the basic principles of artillery construction" (1971 1-2).

Vitruvius' section on artillery and siege machinery in Book 10 of his de Architectura was probably included because it was part of the tradition of architectural treatises that he was following, but also because he was primarily a military engineer and had been particularly concerned with artillery during the civil wars (de Arch Pref.1).

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[4]When an English translation of Aelian was published in 1814, the translator suggested that it could be of use as an example of Roman discipline, which was considered one of the principal reasons for their success (Dillon 1814 Pref.).

Another specialist treatise was the de munitionibus castrorum on the arrangements and fortifications of summer camps. The author claims to have followed all the previous authors who wrote on this subject and claims to be the first to explain all the measuring from the beginning in written instructions (§ 45). Lenoir (1979 ix) has suggested that in addition to earlier treatises hinted at in the text, the author may have made use of Polybius' description of the Roman camp (vi 26-32). The technicality of the work suggests that the author was probably a military surveyor and although the book is addressed to a superior, it was probably intended for use by other surveyors. The author claims to have developed a new system of measuring for marching camps based on the number of legions present, and he believes it is better than the "usual method of measuring" (§ 47). Fraccaro (1934 157) has suggested that Polybius took his account of the Roman camp from a book of military regulations and these works, along with those of the artillery writers, would seem to be written primarily for specialists, surveyors, tribunes, cavalry and artillery officers (as appears to be the case with Pliny's treatise de iaculatione equestri), and so would have a much more specific purpose than the general treatises.

Vegetius, the only writer of a Latin treatise known to have had no military experience, appears to be writing for a number of reasons. The work is a direct descendant of the Greek and earlier Roman treatises, suggesting that the Greek tradition was taken up and continued by the Latin writers in the Roman period. The work draws on earlier authors whom Vegetius lists at one point[5]. The de Re Militari even included a section on the use of elephants and chariots in warfare (cf: the treatises on the phalanx p.20), and sections on

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[5]They are: Cato the Elder, Celsus, Frontinus, Tarruntenus Paternus and the Constitutiones of Augustus, Trajan and Hadrian (I 8).

siege and naval warfare, no doubt following the tradition of Aeneas Tacticus who wrote on all aspects of warfare (see below). The date of Vegetius' work is much discussed (Gordon 1974, Goffart 1977, Birley 1982), but it generally placed in the later 4th century or first half of the 5th century AD. The treatise tends to stress defence over attack, particularly in Book 4 on siege warfare, and this may reflect the uncertain times during which the author lived.

The de Re Militari became the standard military textbook for the western Roman Empire and remained so until well into the Middle Ages. Goffart (1977) describes it as the soldier's equivalent of Benedict's Regula, Machiavelli based his own treatise "Arte della Guerra" very heavily on Vegetius, and Lt John Clarke's translation of Vegetius, originally published in the 18th century, was republished in the present century in the USA along with translations of several other ancient treatises[6].

All the military treatises are ultimately derived from the Greek tradition of writing handbooks on a variety of different subjects. Aeneas Tacticus may be one of the earliest of these writers, and his "On the defence of Fortified Positions" is certainly the oldest surviving work belonging to the military tradition. He is believed to have written some eight pamphlets and treatises on warfare, including castrametation, naval tactics, general tactics and collections of examples à la Frontinus. These may well have formed the basis for many of the later treatises on both individual topics such as castrametation

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[6]Ancient military treatises seem to have become especially popular in the late 18th century and during the Napoleonic Wars; Shepherd's translation of Polyaenus was first published in 1793, and Dillon's 1814 translation of Aelian, intended as a textbook for military schools and colleges, was circulated by order of the War Minister.

like the de munitionibus castrorum, and for the more general works like that of Vegetius.

Whatever justifications the authors themselves give for writing, and virtually all of them hope or claim to be of practical use, the treatises can be divided into three principal types; those providing some instruction in the art of war for officers by general textbooks and collections of examples (cf: Polybius Hist. xi 8 1-2); those providing more detailed manuals on specialist topics such as artillery and camp surveying; those which are a literary and philosophical exercise following a particular Hellenistic tradition[7].

Other Literary Sources

Commentarii

Of the other types of literary evidence dealing with the Roman army in detail, commentarii, because of their very nature, are likely to provide more detailed and accurate information than histories. Syme (1958 157) explains this contrast:

> "Accurate intelligence about numbers and regiments, the detail of operations both principal and subsidiary, the times and stages of a march, such were the facts to be registered in the reports of generals or the commentarii of military emperors."

Thus commentarii could later be published to provide a detailed chronological account of a campaign and source material for historians. The best known, and only surviving examples of these are Caesar's de Bello Gallico and de Bello Civili, but commentarii did not have to relate to a military campaign. Cicero wrote commentarii on his consulship and Vitruvius states that architects

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[7]Some treatises, like those of Onasander and Arrian, belong to both the philosophical tradition and that of providing instruction whilst Heron attempted to make his specialist treatise more accessible to the layman.

should be literate so they can write commentarii on their work, implying that it was the architect's duty to publish them (de Arch.I 14; VII Pref.18). Cicero's account of his consulship was intended as source material for others writing history (Ad Att.11), while both he and Aulus Hirtius claim the same motive for Caesar's works (Brutus 262; BG VIII 1), though of course there was also the propaganda value in publicizing one's military victories, especially in the late Republic.

Syme (1958 297) suggests that Suetonius Paulinus wrote commentarii on his campaign in Mauretania which Pliny used for his description of the area (NH V 14), and it is possible that he produced a similar work concerning his governorship of Britain which was used by Tacitus. Tacitus would no doubt have made use of any commentarii written by his father-in-law Agricola for both the Agricola and the Histories and Syme has suggested that Corbulo published some kind of account of his campaign in Armenia which the historian used (1958 297). Josephus used the commentarii of both Vespasian and Titus to write his account of the Jewish war and because of this, and his presence in the Roman camp during the campaigns, he claims to have produced a more authentic record than any of his rivals (Vita 342, 358; Contra Apion 49). Finally, Trajan published commentarii on his campaigns in Dacia, of which one fragment survives in the 6th century grammarian Priscius, which Cassius Dio may have used.

Histories

Livy, Polybius and Josephus each included an excursus on the Roman army in their histories. Livy's descriptions of army organization and reforms (I 42-43 on the Servian Constitution; VIII 8 on the reforms attributed to Camillus) are included as part of his annalistic history, and were probably inspired by

Polybius' section on the Roman military system. Polybius' main object in writing his history was to explain how "the Romans succeeded in less than 53 years in bringing under their rule almost the whole of the inhabited world" (i Pref.1) and Walbank (1957 698) describes Book six, which includes the section on the Roman military system as "an essential and integral part of Polybius' overall framework". Because of the army's central role in Rome's imperial success, an explanation of its workings was essential, and may have been useful for the author's non-Roman readers. Polybius' account is generally considered to be accurate, partly because had personal experience of the workings of the Roman army, but also because he was probably using some form of textbook for at least part of his description (see above p.21). Josephus also included a description of the army on campaign, probably influenced by that of Polybius, especially his explanation of the Roman method of camping, but his is far less detailed, and he is prone to exaggeration at times[8].

Other authors providing useful information on the army on campaign are Sallust, Appian, Tacitus, Cassius Dio and Ammianus Marcellinus as part of their histories. I do not at this point wish to discuss the accuracy of these historians but will do so later when and if necessary.

Conclusions

The military treatises were written for a number of reasons discussed above. Those pertaining to the Roman army rather than the Greek phalanx describe how, according to their authors, the army should function, or how complex machinery worked, or are advocating the introduction of new techniques, the

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[8]Eg: BJ III 245-6, on the effectiveness of the Roman artillery at Jotapata, sending a man's head flying 3 furlongs.

latter two types being more technical types of manual. The histories and commentaries describe the procedures of the Roman army in the field, in other words, how they really did things. Analysis of the activities of the Roman army in the field using all the forms of evidence available will help to ascertain how realistic the treatises are, whether there are any indications that treatises could be of use, or were actually used, and may provide further information concerning certain procedures and techniques of the army.

Chapter 3: The Strength and Organization of Units

Introduction

The strength and internal organization of legions and auxiliary units is one of the more debated topics of the Roman army. As it has been the subject of numerous studies, it is not the intention of this chapter to consider the matter in great detail. However, several of the ancient treatises provide at least some information on these matters and they are relevant to the arrangement of the line of march and the disposition of forces in the line of battle.

The ancient treatises provide very limited data on the size and internal organization of army units. There is no equivalent for the imperial period of the detailed explanation of legionary organization given by Polybius and Livy for the Republican army. The most comprehensive description of the army relating to the imperial period is that given by Vegetius (Book II), and this deals exclusively with the legion. Additional, much briefer, information, is provided in the de munitionibus castrorum which also contains equally brief comments on the size and internal organization of auxiliary units[1].

The comments made in the de munitionibus castrorum on unit organization are incidental to the work itself. The author claims to be writing his handbook for use by contemporary military surveyors (§ 45-47) who would presumably be aware of the usual organization of army units. As a result, the author finds it unnecessary to give a detailed description of these units and confines himself to providing only the information directly relevant to his work: the number of men in a century (§ 1), the number of horses in each cavalry unit

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[1] DMC § 1, 3 & 5 refer to legionary organization; § 16, 26-28 deal with auxiliary units.

(§ 16, 26), because these numbers have a direct affect on the allocation of space for each particular unit in the camp. The work itself begins by suggesting that some kind of description of legionary cohorts has already been given (§ 1), but comparison with the author's descriptions of the auxiliary units later in the work suggest that it would not have been particularly lengthy.

Vegetius is the only treatise writer to have included a detailed description of the strength and organization of the Roman legion, and this is a much fuller account than that given by the de munitionibus castrorum. Since he is referring to an organization that is obsolete in his time (the antiqua legio, II 7), and that he is actually recommending a return to (I Pref.), it is necessary for him to provide a more comprehensive description of the legion's organization and equipment. In addition, this description is a necessary introduction to Vegetius' third book, which considers the deployment and role of the legion on the field of battle.

Some information on unit organization is also included by military writers such as Caesar and Josephus in their works. Caesar was writing for an informed audience, and so probably did not consider it necessary to provide details about unit size and organization. Despite this, there are a few references to unit sizes, though Caesar is much more useful as a source for the operations of an army on campaign. Josephus' excursus on the Roman army (BJ III 70-109), as noted above (chapter 2), is similar in structure to that of Polybius and may have been written in emulation of the earlier work. Their purpose was partly to explain the workings of the army to non-Romans but Josephus does not include the detailed description of the different forces that Polybius

did, though he does make a few comments on the size of auxiliary forces (BJ III 67).

The Legion

The writer Cincius Alimentus produced a treatise in the early Empire in which he stated that the legion contained 60 centuries, 30 maniples and 10 cohorts (Apud Aulus Gellius NA xvi 4 6)[2]. This is the earliest reference in a treatise to the legionary organization traditionally attributed to the military reforms of Marius in the late 2nd century BC, by which the cohort of three maniples became the principal tactical unit of the army. The commentaries of Caesar clearly illustrate the use of the cohort in this role, tactically more important even than the legion[3].

The transition between the two forms of organization seems to have taken place at some time between the 2nd Punic War, to which the accounts of Livy and Polybius refer, and the mid 1st century BC when Caesar was campaigning in Gaul. Although the introduction of the cohort has frequently been attributed to Marius (Parker 1928 28; Speidel 1992 7), Bell (1965 411) has argued from the evidence of Livy that the use of the cohort as a tactical unit was developed to solve a specific tactical problem, that is the need for tactical units smaller and more flexible than the legion but larger than the maniple for the Roman campaigns in Spain. Polybius appears to state that the cohort contained three maniples (σπειρας)[4]. However, because there was no Greek word for cohort

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[2]Servius (Aen II 463) and Isidorus (ix 461) provide the same information, although the latter states that the legion contained 12 cohorts.

[3]Eg: Thapsus (B.Afr.79-80) where five cohorts of a single legion held each wing.

[4]Polybius xi 23; τρεις σπειρας - τουτο δε καλεται το συνταγμα των πεζων παρα Ρωμαιοις κοορτις.

at this time (Polybius transliterates it as κοορτις), he may be referring simply to three cohorts, using the word σπειρας to mean cohort as it certainly does by the early Empire (Acts 10 1; BJ III 42; IGRom 1 10). Bell argues that the cohort evolved from being a formation introduced for the purpose stated above, to being the principal tactical unit of the Roman army by the time of Marius' campaigns in Africa (1965 416). He states that by the time of Caesar,

> There was a tendency to think of the cohort as the basic unit, employable in any number of ways, of which the formation of legions with groups of ten was only one." (1965 412),

as Caesar's tactics at Thapsus and elsewhere prove (see below chapter 6 on pitched battles). Although the cohort might have been very important tactically, it was the legion that fostered the ésprit de corps, illustrated by Marius' reform of the legionary standards (Pliny NH x 5).

Parker (1932 138-9) and Domaszewski (1887 45 & 69) suggest that the manipular organization was still in force at the time of the de munitionibus castrorum[5]. Schenk (1930 18-26) attributes the abolition of the maniple to Hadrian as part of his general army reforms but there is evidence to suggest that the maniple was by this time, and indeed much earlier, neither a tactical nor an administrative unit, and that what Parker sees as evidence for the continued existence of the maniple in the de munitionibus castrorum (§ 1-5) was in fact only a residual trace of the earlier type of organization, retained by the traditions of Roman camp and fort design; the method of camping two centuries opposite each other during the empire was essentially the same as in the Republican camp described by Polybius (vi 27-32). Lenoir (1979 119) suggests that the different ways for a cohort to camp mentioned in the de munitionibus castrorum disprove the theory that two centuries always camped opposite each other. He adds that the importance of the term hemistrig[illegible]

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[5]For consideration of the date of this work, see below p.36ff.

rather than striga proves that the camping system was organized in terms of centuries rather than maniples. Although most barrack blocks in forts and fortresses are found in pairs, this also could be simply a continuation of the traditional method of camping and not prove anything about contemporary legionary organization[6].

The term manipulus continued to be used in military contexts by historians and commentators such as Tacitus and Caesar, though for Tacitus the actual meaning of the word has become less precise. As stated above, Caesar appears to have been using fully developed cohort tactics during his campaigns in Gaul and he rarely uses the term manipulus[7]. In his commentaries, Caesar appears to use the term usually in technical contexts such as manipulos laxare, to open out the ranks (BG ii 25). Although the term is not found in Livy or any other Latin writers on military subjects, it may refer to an actual drill used in battle, the terminology for which had not been altered, although it would have been centuries and cohorts carrying out the order rather than maniples[8].

Tacitus seems to use the term manipulus to denote simply a group of soldiers smaller than a legion, and generally smaller than a cohort, particularly when he is referring to the line of battle (eg: Annals iv 25; Hist.iv 78). Tacitus rarely uses the term centuria, and this is usually when he wishes to emphasize the small size of the unit or group of men he is referring to. He does not seem to differentiate between a century and a maniple; to him they seem to be simply

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[6]Since a cohort contained six centuries, the easiest and neatest method of camping them was in pairs.

[7]Caesar uses the term only five times; BG ii 25; vi 34; vi 40; BC i 76; ii 28.

[8]The Greek equivalent is διαστημι, Appian Mithr.42; BC II 79; Dio 37 4.

sub-units of a larger force, and these sub-units are of indeterminate size; Tacitus felt no necessity to provide further technical information.

The epigraphic evidence also suggests that the maniple was an obsolete organization by the early Imperial period. Inscriptions very often record the century to which the soldier belonged as well as the legion, and some provided details of the cohort as well as the century[9]. The term manipulus, by contrast, is never used on such inscriptions, and is only found in its compound form commanipularis which appears to mean simply 'fellow soldiers'[10]. This also seems to be the way historians such as Tacitus use the term (Hist.iv 46; SHA Pesc.Niger 10) and it does not appear to refer to an administrative or tactical unit.

Information is given on the total numerical strength of the legion by a number of sources. The Republican legion, according to Livy (viii 8; xxi 17), contained 4000-5000 infantry and 300 cavalry, whereas Polybius (vi 20) indicates 4200 infantry and 300 cavalry. The numbers relating to the imperial legion also very; the legion of the de munitionibus castrorum totals just over 5000, Vegetius' well over 6000 (II 6). According to Suidas, Servius, Isidorus and Lydus, the Roman legion numbered 6000 (Suidas II 519; Servius Aen.VII 247; Isidorus Orig.XI 346; Lydus de Mag.I 40). Alexander Severus raised six legions, each with a strength of 5000 men (SHA Alex.Sev.50).

However, during the Republic the actual strength of the legion could very considerably. Polybius states that in times of particular danger the infantry could be increased to 5000 (vi 20) and Livy notes the fluctuations in legionary

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[9]eg: CIL III 6594, 6605, 6611, 12054.

[10]eg: CIL III 6577; VI 30881; VIII 9615; X 1766, 1775, 6069.

size, particularly occasions when legions are increased in reaction to an emergency; in 216 BC the legions were increased by 1000 infantry and 100 cavalry giving an infantry strength of 5000 and 300 cavalry (Livy xxii 36), and in 204 BC Scipio increased two of his Cannae legions to 6200 infantry and 300 cavalry (Livy xxix 24)[11]. Whatever its paper strength, in practice the legion could be much smaller. At Pharsalus, Caesar's cohorts appear to have been greatly under strength compared with the size suggested by the writers of the Imperial period. Caesar's 80 cohorts at the battle totalled 22,000 men, giving a cohort strength of under 300 and total legionary strength of about 3000 (BC III 89). These numbers may be especially low because Caesar's army had been engaged in civil war for some years and he may have been unable to obtain enough recruits to bring his units up to their theoretical strength.

It is impossible to use the same method to ascertain the actual strength of legions during the imperial period because of the lack of detail in historians' accounts of ancient battles. Alston has used legionary discharge dedications in an attempt to calculate the approximate number of recruits and strength of legions under the Empire. Taking the age of recruitment as between 15 and 25, and basing a mortality rate for the 25 years service on Hopkins' UN figures (1966), Alston concludes that about 50% of recruits would survive to discharge. However, the available sample of inscriptions is very small, with only seven discharge lists surviving in a suitable state, all dating to the 2nd century, and these may not provide an accurate assessment of the strength

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[11]Although this fluctuation may have been due to residual custom since the legions were in theory of a set number for each consul, in times of crisis it was much easier and quicker simply to increase the size of the legions rather than raise more from scratch.

of all legions[12]. The information the inscriptions contain may be tabulated as follows:

Reference	Legion	Year(s) of recruitment	Veteran numbers
CIL III 6178	V Macedon.	c.109	114+
AE 1955 238/ 1969 633	II Traiana	132/133	133
CIL III 8110	VII Claudia	134/135	239
CIL VIII 18067	III Augusta	140/141	90+
CIL III 6580	II Traiana	168	c.100
CIL III 14507	VII Claudia	169	c.180
CIL VIII 18068	III Augusta	173	90+

The discharge of 239 men from Legion VII Claudia who were recruited in AD 134/135 (CIL III 8110) represents the recruits of two years and suggests a total legionary strength of c.4500. This corresponds very well with what might be expected for a legion of the type described by the de munitionibus castrorum that is slightly under paper strength. As Alston points out, the numbers of veterans discharged for each year of recruitment varies considerably, with only c.66 per year for Legion II Traiana in the mid 2nd century (AE 1955 238; 1969 633), suggesting a legionary strength of c.2500 whereas the large discharge from Legion VII Claudia who were recruited in AD 169 (CIL III 14507) suggests a legion that is greatly overstrength[13].

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[12]Dr Alston and I carried out much of the epigraphic work for this study together.

[13]Alston rejects the theory that Legion II Traiana suffered very high casualties in the Bar Kokba revolt resulting in small numbers of veterans, and explains the large Legion VII Claudia discharge in AD 194 (recruited in AD 169) as representing a massive reinforcement of the legion in preparation for Marcus Aurelius' Danubian wars. These calculations do not take into account the possibility of high mortality rates due to illness, such as the plague during the reign of Marcus Aurelius.

Alston provides further evidence to illustrate that Legion II Traiana may well have been understrength in the form of the centuries named in the AD 194 discharge list (CIL III 6580). Of the 22 centuries named in this inscription, 8 are identified by the adjectival form indicating that the century lacked a centurion[14]. Alston suggests that the delay in filling the posts of centurion showed there was no pressure to keep the number of officers and troops up to theoretical paper strength.

The Treatises

The two principal treatises which provide information on legionary strength, the de munitionibus castrorum and Vegetius, are problematic because it is not known to what date the descriptions are relevant. Vegetius simply refers to his legionary organization as the antiqua legio (II 4), and the date of the de munitionibus castrorum is much disputed.

The de munitionibus castrorum.

This treatise provides the principal details of what is considered by many to be the standard legionary organization of the early imperial period (accepted by Webster 1985 110 and Luttwak 1976 fig.1.1). The author states that a century contained 80 men (§ 1). The area assigned to each legionary cohort implies that there were six centuries to a cohort (§ 2), whilst the first cohort was of double strength (§ 4), although the author does not indicate how many centuries this double cohort contained. The author never actually states that a legion contained ten cohorts, but this may be assumed from other comments (eg: § 18 refers to the 10th cohort camping by the porta decumana).

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[14]This adjectival form is also fairly common on the centurial stones from Hadrian's Wall and this is discussed by Birley (1951 71-72).

Dating

Many attempts have been made to date the de munitionibus castrorum, and suggestions range from the late 1st century to the mid 4th century AD. The various elements of dating evidence are discussed by Lenoir (1979 111-133). Much of the argument concerning the dating of the work centres on the composition of the army described in the text, and using this to associate the work with a particular campaign. This method has been used by Birley (1953, 1981, 1982) and Frere (1980) who both associate the work with a war on the Danube, partly because of the presence of the emperor himself on the campaign, and of four milliary alae in the army[15]. The two different arguments will not be repeated here, but on the grounds of composition of the force, Frere dates the text to the Danubian wars of Domitian, between AD 85-89, whilst Birley (1982 279) rejects some of Frere's arguments about the existence at such an early date of some of the units mentioned, and prefers instead the Marcommanic wars during the middle years of Marcus Aurelius' reign. Birley argues for this later date almost solely on the composition of the army, though Frere also uses archaeological evidence.

Lenoir (1979 111) is generally critical of these attempts to tie the treatise down to a particular war of campaign of a certain emperor. He suggests that the characteristics of the work show that it is military theory and believes that war is unlikely to be the time for the introduction of a new method of camping because of the inevitable teething problems. Lenoir goes on to suggest that the force described is not a real field army but a mixture of all the different types of unit serving in the Roman army. This argument neatly solves the problem of the four milliary alae serving together; Lenoir believes that no such

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[15]With only 8 known milliary alae at this time, an army containing four of them would represent a massive concentration (Holder 1980 Appendix III).

army would ever have been constituted. Having dismissed the use of force composition as dating evidence, Lenoir then considers other dating evidence in the treatise, including the use of particular vocabulary. His conclusions are that a 2nd century date is required by the presence of a legatus legionis and the strength of the praetorian cohorts, and a Trajanic date implied because this was the only period when all the terms he considers (veredarii, classici, metator, vexillarii and the epithets referring to the emperor) were in use, as well as Trajan's supposed preference for milliary alae (Lenoir 1979 126).

The work itself is theoretical in nature, as Lenoir points out, but the author hoped and probably expected that his new method of camping would be field-tested (§ 45/47). However the work may be categorized today, the author at least intended the work to have some practical application. Although I agree with Lenoir's criticisms of attempts to date the treatise to a particular campaign, I do not agree with his suggestion that a new way of camping would not be introduced during wartime. The author believed that his method was more logical and an improvement on other methods (§ 45/47) and it is frequently the case that improvements in military equipment and practices are made during times of war rather than peace. There is therefore no reason to suggest that the de munitionibus castrorum relates to any period of war or peace.

Since the army of the de munitionibus castrorum appears to be hypothetical, the work must be dated using the kind of evidence Lenoir considers, in particular the use of the clavicula in camp defences which Frere (1980 57) also mentions. The de munitionibus castrorum appears to suggest the use of both claviculae (§ 55) and tituli (§ 49) to defend camp gates. As with the literary

evidence, Lenoir concludes that the work dates to the early 2nd century AD, and specifically to the reign of Trajan[16].

Vegetius

Vegetius' description of the legion, although detailed, gives rise to a number of problems as it is not known which sources the author was using for his information or the date for which the description is relevant. Vegetius simply refers to the organization as the antiqua legio (II 4) and provides particulars of the infantry and cavalry strength of each cohort of the legion. The organization of the legion cannot itself be derived directly from Cato's treatise de Re Militari since that work was probably written before the complete adoption of the cohort system as opposed to the more traditional manipular formation of Livy and Polybius. However, the influence of treatises dating to before the cohort reforms is evident in comments such as each consul commanding two legions (II 4) and Schenk (1930 25-36) had suggested that Vegetius made use of Cato in compiling this section of his treatise. As stated above, the transition between the two forms of organization seems to have taken place at some time between the 2nd Punic war, to which the accounts of Livy and Polybius refer, and the late 1st century BC, when the commentaries of Caesar illustrate the use of the cohort as the principal tactical unit. Vegetius is therefore likely to be using a Republican source for some parts but a late Republican or later source for his section on legionary organization.

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[16]Lenoir (1977) 697-727; (1979) 132 on dating of claviculae. For further discussion of claviculae and camp defences, see below, chapter 4 on Marching Camps. Birley's suggestion that the de munitionibus castrorum is contemporary with Vegetius (1982) seems very unlikely since the basic structure of the legion is totally different (Vegetius' five centuries per cohort against the six per cohort of the DMC).

According to Vegetius the legion was the main reason for Rome's greatness (II 2) as it contained light and heavy infantry as well as archers, artillerymen and cavalry and was capable of defeating any size of enemy without any support from 'foreign' auxiliaries, supplied by allies and confederates (II 1). On the whole, Vegetius does not have much regard for the auxiliaries, referring to them as coming from different parts of the empire and having different strengths, each with its own organization, customs and methods of fighting. At the beginning of book II, Vegetius states that the military establishment consists of cavalry, infantry and the navy (II 1). Although Vegetius describes the navy and the legion in detail, he does not give any further consideration to the cavalry other than that attached to the legion, or to auxiliary units, not even when describing the disposition of the army in the line of battle. Cooper (1968 60) suggests that Vegetius worshipped the legion and "could not bring himself to admit that the legion was dependent for outside help on anything essential." However, Vegetius may have been using only a description of the legion as a source for this section and so tends to emphasize the role of the legion in the absence of any detailed information on the auxiliary units. As suggested above, Vegetius probably used Republican sources as well as later works for this section, and as the Republican legion contained light armed troops Vegetius may simply be referring to these (Veg.I 20; II.15; Livy viii 8; Polybius vi 20).

Vegetius' description of the legion is fairly complicated. His legion was divided into 10 cohorts, the first of which was of double strength (milliary), and also contained soldiers selected for particular qualities (II 6). The first cohort contained 1105 infantry and 132 cavalry. Each of the remaining 9 cohorts contained 555 infantry and 66 cavalry, giving a total of 6100 infantry and 726 cavalry (though Vegetius seems to get his calculations wrong and

gives a cavalry total of 730). He ends the description with the interesting statement that these were the minimum numbers for the legion, and that the number was sometimes increased by the addition of other milliary cohorts[17].

Vegetius provides more information on the structure of the first cohort later in his 2nd book when explaining the duties of the centurions in this cohort (II 8). According to the author, the primus pilus commanded 4 centuries, or 400 men, the hastatus prior 2 centuries, or 200 men, the princeps and hastatus posterior each commanded 1½ centuries, or 150 men, and the triarius prior (Vegetius presumably means the princeps prior) 1 century or 100 men. According to this arrangement, the first cohort had 10 centuries of 100 men, commanded by 5 centurions, though the distribution of centuries to each centurion was uneven.

Another inconsistency in Vegetius' description is the numerical strength of the first cohort. At one point he states it is 1105 (II 6), presumably including the 5 centurions, but later the number totals 1000 (II 8). However, at this point Vegetius also mentions decani "who are now called caput contubernii" each commanding 10 men, and there would have been 100 of these in that cohort, giving a total cohort strength of the 1105 Vegetius mentions. Cooper (1968 41) suggests that Vegetius invented the rank of caput contubernii to make up the numbers[18]

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[17]Cooper (1968 55) suggests that Vegetius was confusing auxiliary cohorts with legionary and while auxiliary quingenary cohorts could be made milliary, the legionary cohorts could not, but see below p.56.

[18]An inscription from Usk, however, referring to the contubernium Messoris, suggests that there may have been some kind of hierarchy within the contubernium, and possibly a caput contubernium, as Vegetius suggests (Britannia 7 (1976) 391, No.66).

Quern at Saalburg inscribed 'contubernium Brittonis'

After describing the strength of the cohorts, Vegetius then lists the different officers attached to the legion, the prefect who commanded the legion (formerly a legate), the prefect of the camp and the praefectus fabrum (II 9-11). There then follows a brief account of the qualifications and duties of military tribunes (II 12). Vegetius states that the first cohort was commanded by a particularly well qualified tribune while the other nine were commanded by tribunes or other officers specially chosen by the emperor as cohort commanders. The only other pieces of information about legionary organization in this section of Vegetius' treatise are about the size of turmae, the troops of cavalry attached to the legion (II 14) and the legionary artillery (II 25). As stated above, in Vegetius' description the units of cavalry are attached to particular cohorts, and with 32 men and a decurion in each turma. The milliary first cohort had four turmae whilst the nine other cohorts had two each. According to Vegetius each century of the legion had a ballista served by ten men from that century and there are therefore 55 of these engines in each legion. There were also ten onagri, or stone throwing machines, one attached to each cohort.

Cooper (1968 chap.3) has attempted to explain the origin of Vegetius' antiqua legio, suggesting that it never in fact existed, but was invented by the writer from what information he had available. He suggests that Vegetius obtained his cohort strength of 550 from the size of legionary vexillations of the early Empire which consisted of one cohort with support staff of engineers and medics etc. and from this basis devised what he thought was the antiqua legio through mathematical juggling. However, at the time of the de munitionibus castrorum legionary vexillations varied in size[19]. In addition, Vegetius' work

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[19]This suggestion is made on the grounds of the 550 men mentioned by Dio (lxxv 12) and from the figures in the de munitionibus castrorum § 5 & 30.
(continued...)

is partly a compilation of earlier works (Schenk 1930). The author presumably had access to treatises describing the organization of the legion in earlier periods, so there is no reason for him to have invented the legion which he describes; he could simply have obtained his information from the earlier works.

Dating

One of the major difficulties in the dating of the antiqua legio is that Vegetius made extensive use of earlier treatises when writing his own (see above chapter.2). Cato seems to have been one of the most influential of these works since his account of the legionary dispositions in the line of battle reflects strongly the situation in the Republic as described by Livy and Polybius.

There is little agreement on the date of the antiqua legio. It has been placed in the reign of Diocletian, the later 3rd century and the 2nd century[20]. Schenk (1930) and others believe that Vegetius copied his description of the legion from the latest of Vegetius' named sources, Tarruntenus Paternus, but all the evidence suggests that the organization of the early empire was still in force, with all cohorts but the first containing six centuries. Silhanek suggests that Vegetius may have been using two sources for his section on the antiqua legio, one for II 7 and another for II 8-13, presumably because of the repetition of some information, and it seems quite likely that this was the case, and that this may be one of the major problems in dating and using Vegetius'

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[19](...continued)
However, Speidel (1984 307) has since shown that the 550 mentioned by Dio belonged to an auxiliary unit. On the size of vexillations: CIL III 7449 mentioned one 75 strong; CIL V 5829, three milliary vexillations, and a vexillation 8000 strong from three British legions was sent to Italy to support Vitellius (Tac.Hist.II 57; III 22).

[20]For the arguments concerning these dates, see Parker (1932) and Sander (1940 382-391).

description of the antiqua legio; by using a number of sources from different periods and amalgamating them, Vegetius may well have ended up producing something that was almost totally fictitious[21].

Auxiliary Units

The strength and internal organization of auxiliary units is as problematic and contentious as that of the legions[22]. Little information is included in the treatises or other literary works, and after mentioning them briefly at the beginning of Book II, Vegetius makes no further reference to the auxiliaries, or socii, and does not consider their role in the line of battle. There is, however, papyrological evidence for the auxiliary units which is for the most part lacking for the legions.

Josephus mentions two types of auxiliary units when describing the Roman force invading Judaea (BJ III 67). The force included ten infantry cohorts 1000 strong and 13 cohorts which had 600 infantry and 120 cavalry. Josephus is undoubtedly referring to the milliary infantry cohort and quingenary cohors equitata, although at their theoretical strength, assuming a century of 100. Birley (1966 55) has questioned whether milliary auxiliary units existed at such an early date, but despite Josephus' tendency to exaggerate figures, I see no reason to reject his statement on the grounds that the earliest epigraphic evidence for milliary units postdates this reference.

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[21]I am grateful to Dr Richard Alston for discussing this section with me and making this suggestion.

[22]The subject has been most recently and comprehensively dealt with by Holder (1980).

The de munitionibus castrorum provides the most detailed evidence relating to the subject, though the author only provides the basic numbers in the six different types of auxiliary units.

Table illustrating unit strength according to the de munitionibus castrorum

	Quingenary	Milliary
Infantry cohort	6 centuries (§ 28)	10 centuries (§ 28)
Cohors equitata	6 centuries + 120 cavalry (§ 27)	10 centuries + 240 cavalry (§ 16)
Ala	16 turmae (§ 16)	24 turmae (§ 16)

Unfortunately the author provides no details about the strength of the auxiliary century or turma so it is impossible to tell the exact theoretical strength of these units. However, for the cohors equitata at least, more can be inferred from the space allocations given in the text.

Attempts have been made to give century and turma sizes from the Coptos inscription (CIL III 6627), and to fit these in with the theoretical strengths in the de munitionibus castrorum. Thus the 788 men from 7 auxiliary cohorts mentioned on the inscription are divided between the ten centurions to provide a century size of 78 (Holder 1980 7), and the 424 equites are divided among the 10 officers (5 decurions, 1 duplicarius and 4 sesquiplicarii) to give a turma size of 42 (Domaszewski 1887, but see below p.47). However, the legionaries appear to have been chosen at random, one from each century, and there is no reason to suppose that the same was not done with the auxiliaries; the 788 infantry do not have to represent ten centuries, and there may not be any definite correlation between the number of infantry and number of centurions, or the number of cavalrymen and decurions and junior officers, and this

inscription provides little useful evidence for the organization of auxiliary units.

The pridianum of Cohors I Tungrorum (Vindolanda tablet Inv.no.88/841; JRS 81 (1991) 62-73) can be used to illustrate the difficulties of establishing turma or century size from the number of officers and troops. Various detachments had been sent from Vindolanda, each under the command of one centurion; thus 337 were at Coria under 1 or 2 centurions; 6 at London under a centurion; 9 somewhere else under a centurion. It is clear from this that the number of centurions in vexillations may not bear any relation to the number of soldiers in these vexillations.

To facilitate the calculation of space required for a milliary part-mounted cohort, the author supplies the formula by "transferring into infantry" the cavalry (§ 25-26). The total space required for this unit is that for 1360 infantrymen. The 240 cavalrymen each receive 2.5 ft whilst the infantry receive 1 ft. The 240 cavalry thus take up 600 ft, or 600 infantry spaces. The remaining 760 infantry spaces give the approximate strength of the 10 centuries of infantry belonging to this unit since they receive 1 ft, or 1 infantry space each. This approximate total of 76 per century is very near to the 80 per century of the legions and it seems likely that in theory at least the century sizes were supposed to be about the same.

Many modern writers state that the quingenary cohors equitata had 380 infantry and 120 cavalry, quoting the de munitionibus castrorum to prove this (§ 27). The figure of 380 is obtained by halving the 760 infantry for the milliary unit which is implied in the text in § 25-26 (Cheesman 1914 29-30; Lenoir 1979 74). However, I believe this is a misinterpretation of the text.

§ 27 states that the quingenary cohort had half the numbers but the same organization as the milliary (Cohors equitata quingenaria in dimidio eandem rationem continet quam cohors milliaria), but later in the same section the author states cohors equitata quingenaria habet centurias VI, reliqua pro parte dimida. I believe that the author is only referring to the cavalry at this point, signified by the use of the word reliqua, and that it is only the cavalry that had half the numbers of the milliary cohort; he is not stating that the six centuries of infantry only contained 380 soldiers, with 62 per century.

Birley (1966 54) does suggest different century sizes in the auxiliary cohorts, 80 per century in the milliary cohors equitata and quingenary infantry cohort, and 60 per century in the quingenary cohors equitata. Davies (1971 110) and Holder (1980 8) however, suggest that all auxiliary centuries were theoretically the same size and that auxiliary units were based on legionary strengths. This seems the most sensible suggestion, and anyway, if the theoretical strengths of auxiliary centuries were different this would surely cause problems in the relative seniority of auxiliary centurions; for in this situation presumably a centurion in a quingenary infantry cohort, with centuries of 80 men according to Birley, would be superior to a centurion in a quingenary cohors equitata, with centuries of c.60 men.

There is more evidence for the size of the auxiliary turma than for the century. Polybius states that the Roman cavalry of 300 was divided into 10 turmae (vi 25); this gives a turma strength of 30. Arrian in the Tactica states that a Roman ala contained 512 men (18.3), and since the de munitionibus castrorum gives 16 turmae for this unit (§ 16), confirmed by epigraphic evidence (CIL III 6581, listing the 16 decurions of two alae in Egypt), this suggests a turma of 32. However, Arrian is at this point describing Greek

cavalry units and his comparison of the size of the Greek with the Roman ala may be an approximation, and is not necessarily numerically accurate. The 'diploma' of Pompeius Strabo of c.89 BC conferring Roman citizenship on Spanish auxiliary cavalrymen lists 31 cavalrymen belonging to the Turma Salluitana (ILS 8888). This could suggest a turma size of 30 or 32, whilst Vegetius (II 14) gives the strength of the legionary turma at 32, which Cooper (1968 60) believes he obtained from the size of the auxiliary turma. Although the exact theoretical strength of the turma is unknown, the evidence clearly points to 30 or 32.

The strength of the turma in the milliary ala is, however, disputed. As stated above, Domaszewski suggested a strength of 42 on the basis of the Coptos inscription (CIL III 6627), partly because 32 per turma was considered too low a number for a milliary ala; at 32 per turma, the 24 turmae in this unit (DMC § 24) would give a total strength of only 768, hence the suggestions of larger turmae, at 42 or 40 (for the arguments, see Holder 1980 9). Cooper (1968 31) suggested that the first turma in a milliary ala was double strength and that the other 23 turmae contained 40 troopers each, giving a total of exactly 1000, and cites DMC § 16 to prove this. The treatise states that a milliary ala has "96 horses over the 1000, which is the number calculated when the extra horses are discounted". Cooper seems to have simply taken this as proof that the milliary ala contained 1000 troopers, and has failed to read the rest of § 16, which goes on "3ft are calculated for each trooper; their number is established at 1000 so that the prefect of the ala can be assigned an area in the space and their principales can camp in a more spacious way." The milliary ala does not contain 1000 troopers; the author of the de munitionibus castrorum has used that number because then there would be sufficient space for the officers to camp and it is an easy round number for use in his formulaic method

of camp arrangement[23]. Far from being used as proof of 1000 troopers in the milliary ala, this section of the treatise can be used to suggest that there were well under this number in the unit[24].

Since the papyrological evidence has been considered in detail elsewhere (Holder 1980; Hassall 1983), I shall not repeat it here. Suffice it to say that the evidence for quingenary cohortes equitatae suggests the 120 cavalry were divided into 4 turmae 30 strong, but the infantry in these units appear to be below their theoretical strength[25]. The pridianum of Cohors XX Palmyrenorum, however, suggests that the unit was vastly above its theoretical strength, with 6 centuries of 140-150 men and 5 turmae of c.70 men each (Fink 1). Davies (1967 108-11) attempted to explain this seemingly anomalous arrangement as a milliary cohors equitata with outposted centuries and turmae, but like Hassall (1983 99), I prefer the simpler explanation offered by Mazzarino (1971 61-4) that the original establishment was 6 centuries and 5 turmae, and the size of these had been increased to strengthen the cohort.

The evidence from Valkenburg may also suggest the enlargement of centuries in an auxiliary unit; the fort was occupied c.AD 40 by Cohort III Gallorum equitata and excavations revealed four pairs of infantry barracks, each pair

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[23]The arrangement of the camp described in the de munitionibus castrorum will be discussed in detail in the following chapter.

[24]Assuming a turma strength of 30 and total unit strength of 720, this would leave 280 man spaces for the decurions and commander, perhaps 10 man spaces per decurion and the remaining 40 man spaces for the commander. Since the legionary centurion received ten times the space of a legionary (DMC § 1), this calculation may be approximately correct.

[25]Cohors I Hispanorum Veterana Equitata (Fink 63), Cohors I Augusta Praetoria Lusitanorum Equitata (Fink 64) and an unidentified cohort (JRS 1977 50-61).

having one centurion's quarters, rooms for principales, fabriculae and 14 contubernia. In his review, Hassall has suggested that the four pairs of infantry barracks may have housed four enlarged centuries of c.112 men each (1977 115-7). The quingenary Cohors I Tungrorum may also have had enlarged centuries as 761 men and only 6 centurions are recorded (JRS 1991 62-73)[26]. This evidence suggests that perhaps auxiliary cohorts were not as uniformly arranged as might have been expected from the information contained in the de munitionibus castrorum.

Vegetius states that his description of the antiqua legio provides the minimum numbers for the legion, and that the number was sometimes increased by the addition of other milliary cohorts (II 6). There seems no reason to reject the possibility that auxiliary cohorts could also be strengthened if necessary. Vegetius' milliary legionary cohorts do not require extra centurions if they are on the same establishment as the first cohort, with five centuries each (II 8). In the auxiliary units, it would probably be simpler to increase the size of the centuries rather than add more centuries to the cohort so that it would at least retain its original structure and additional centurions would be unnecessary. The epigraphic evidence suggests that the milliary first cohort of the legion contained five double centuries rather than ten single centuries, so if a legion was augmented, as Vegetius suggests could happen, it may have been done simply by increasing the size of the centuries. Legions were increased in size during the Republic in times of crisis (see above p.32) and there seems no reason to suppose this did not also happen during the Empire. One of the great advantages of the cohort system was its flexibility, and perhaps this also

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[26]It has been suggested that the fluctuations in century size were caused by the gradual change of the unit from quingenary to milliary status (JRS 1991 67).

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included flexibility in the size of the units and sub-units, both legionary and auxiliary.

Archaeological Evidence and Unit Size and Organization

Various attempts have been made to illustrate unit strength and organization using fort sizes and plans, and the number, type and groupings of barrack blocks within forts and fortresses. Richmond (1955 304-6) attempted to assign particular forts to the different types of auxiliary unit using this method, and then went on to suggest "type sites" of auxiliary forts for the different types of auxiliary units described above. Richmond was using primarily the information given in the de munitionibus castrorum as his basis for associating different auxiliary units with forts and the information given in this treatise suggests that all the auxiliary units were of standard sizes and organizations. Studies of fort size and unit type are usually based on the hypothesis that:

> "If Roman auxiliary units were standardized in size through the early principate...then there should be a correlation between fort size and primary garrison" (Bennett 1986 707)

There are numerous problems in using the archaeological evidence for this purpose, many of which have been fully considered by Davison (1989 168-74), such as vexillations and outpostings, changes of garrison, and the huge variety of barrack blocks both between and within different forts. One of the major problems, however, is that the available sample is very small, with only a handful of forts being fully excavated like Elginhaugh or Valkenburg whilst the remainder of fort plans have been mainly reconstructed from selective excavation.

Bennett (1986) compared fort areas in the N.W. provinces with garrisons in cases where the primary garrison was known, with regard to the hypothesis

mentioned above concerning correlation between fort and unit size. His conclusion is that:

> "In the European part of the Empire there does not seem to have been any direct correlation between fort size and the majority of the units known." (Bennett 1986 711)

Bennett's hypothesis, however, does not include the possibilities of outpostings, vexillations etc. mentioned by Davison, and indeed admits that his primary hypotheses are incorrect:

> "Either Roman auxiliary units were not standardized in size... or there is the possibility that some auxiliary forts actually contained a composite garrison, perhaps more than one unit or parts of several units being brigaded together."

Both these comments are quite possibly true, certainly the former and, I would claim, the latter. As Bennett goes on to point out: the papyrological evidence suggests that not all auxiliary units were organized in the way that the de munitionibus castrorum suggests. Bennett concludes by stating that it is likely that:

> "The Roman army, like any other army, had units that could very in size and composition from place to place and from period to period." (Bennett 1986 716).

To obtain information on the actual organization of units rather than simply their overall strength, it becomes necessary to study the internal arrangement of forts, and particularly the accommodation in forts for both soldiers and horses. The number of barrack and stable blocks for each type of auxiliary unit at full theoretical strength has been calculated by Holder (1980 10). Studies on this basis have been carried out by Richmond (1955), Hassall (1983) and Davison (1989), and the latter states that one of the principal reasons for his study of Roman barrack blocks was the identification of garrisons through differences between barracks of the various auxiliary units and legionaries (1989 252).

Very few excavated forts conform to Richmond's 'type sites'. As Davison points out:

> "A small number of forts may come into this category: but the great disparity in the evidence presented tends to call into question the concept of the type-sites." (1989 55)

For those sites which do not appear to be 'type sites', suggestions are often made for the type of garrison the fort may have held, from the number and type of barrack blocks, and the number of stables when these can be identified[27].

Strageath is such a site and an attempt has been made to identify the garrisons of the three periods of occupation (Frere & Wilkes 1989 117-138). The identifications appear to be based primarily on the dimensions of barrack blocks and number of contubernia, and it has been suggested that the Flavian and Antonine II forts contained parts of more than one unit whilst some of the centuries may have been under strength[28]. Although there were variations in the barrack construction which were attributed to two different cohortes equitatae, the variations were not enormous and other suggestions could be made as to the identity of the garrison[29]. It does seem quite likely that detachments from a number of units may have been brigaded together. However, unless contemporary epigraphic or papyrological evidence can indicate the type or strength of a fort's garrison, attempts to identify the

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[27]On the difficulties in identification of stables, see Johnson 1983 176-182.

[28]The Flavian period garrison is suggested at a cohors equitata minus one of its centuries and two of its turmae; four turmae and three centuries of a second cohors equitata; a legionary century. The Antonine II fort as one cohors equitata at almost full strength; part of a second cohors equitata, with four turmae and two centuries, one of these centuries being under strength by two contubernia.

[29]Eg: for the Flavian period a single overstrength cohors equitata. Strageath is a good example of the great difficulties in attempting garrison identification from archaeological evidence alone.

garrison from the number and type of internal buildings in a fort can in almost all cases be little more than guesswork.

Theoretically, if one accepts the figures in the de munitionibus castrorum as accurate in practice and assuming the army had a fixed and rigid organizational structure, the number of contubernia in a barrack block should provide some idea of the approximate size of turmae and centuries. These are usually the indicators used by those attempting to identify garrison types. Davison's thorough analysis of barrack blocks in both forts and fortresses shows that the number of contubernia in these blocks can vary enormously (1989 figs.9-9.7), even within forts where the entire garrison is known to have been solely infantry or cavalry. He suggests that:

> "The different numbers of contubernia may be significant, but are not necessarily so." (1989 187).

Despite this, Davison's work has provided some information on the probable size of the century in the quingenary cohors equitata. It was stated above that the size of the century in this unit was disputed (p.45). However, Davison has shown that where it is possible to identify the type of garrison of particular forts, the barracks of quingenary cohortes equitatae are not in general smaller than the barracks of other infantry units, suggesting that the centuries in this unit were not smaller than in other auxiliary units (1989 253).

However, analysis of Davison's figures illustrating contubernium areas (1989 fig.10-10.7) shows the great variation in the size of contubernia at both forts and fortresses throughout the period being studied. With such a wide variation in the size and number of contubernia per barrack block, it is possible that the number of men per contubernia, and indeed the number of contubernia per century, may have varied between different units and legions at different times. The study of the size and divisions of barrack blocks may

therefore provide very little information on the size and organization of centuries and turmae.

Similar analysis has been made of the layout and barrack blocks of legionary fortresses. Thus, Inchtuthil appears to illustrate perfectly the size and organization of the legion described in the de munitionibus castrorum, and it is partly for this reason that Frere prefers a 1st century date for the work. The fortress at Inchtuthil has nine groups of barrack blocks, each with six centuries, and a further series of barrack blocks with five courtyard houses which has been identified as the accommodation for a milliary first cohort with the five centurions mentioned by Vegetius (II 6). Inchtuthil may be unique in having this provision for a double first cohort and various attempts have been made to explain the need for extra accommodation, such as that for soldiers with clerical and technical duties, and for veteran soldiers, the former rejected by Breeze (1969), the latter by Frere (1980). However, Inchtuthil contains only one phase of occupation, with none of the rebuilding that most other legionary fortresses went through, and it is one of the most fully excavated fortresses.

Attempts have been made to illustrate the milliary first cohort in the archaeological evidence of other legionary fortresses, and to show the barrack groupings of the different cohorts. A number of fortresses have sufficient space to one side of the principia to house a milliary first cohort, but only barrack accommodation for the six centuries of a quingenary cohort remain, eg: Chester, Caerleon, Neuss, Nijmegen, amongst others (Petrikovits 1975 38; Frere 1980; Davison 1989). It has been suggested that at some point the first cohort was milliary, but was then reduced to quingenary size, and it is this reduced size first cohort that is reflected in the remains of barrack blocks at

most legionary fortresses (eg: Davison 1989 57). This 'reform' of doubling the first cohort is usually dated to the Flavian period to tie in with the evidence from Inchtuthil and elsewhere[30].

However there is no evidence to suggest that all legions had milliary first cohorts at any one time. Assuming this cohort was not double because it contained the legion's skilled workers or veterans (see above p.54), first cohorts may simply have been doubled in provinces where legions were more likely to have been on campaign, such as Britain in the Flavian period. It may have been a convenient way of increasing the legionary strength. As stated above, Vegetius mentions that other cohorts can be made milliary to increase the strength of the legion (II 6). This thinking may have been behind the original decision to increase the size of the first cohort, and such an increase would presumably only have been necessary if a legion was likely to see action.

Neuss

Groupings of cohorts, including a quingenary or milliary first cohort, are clearly definable at some fortresses such as Inchtuthil and Caerleon, though at others they are more difficult or even impossible to define. Neuss illustrates these problems well. The legion occupying this fortress in the two stone periods appears to have been accompanied by auxiliaries. Auxiliary units attested at Neuss are the Ala Parthorum (Alföldy 54), Ala Afrorum (Alföldy 20), a Cohors Lusitanorum (Alföldy 140) and the Ala Picentiana (Tac

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[30]Excavated barracks of quingenary first cohorts usually belong to the stone constructions of fortresses and usually date to the later Flavian period onwards, eg: Chester, Caerleon.

Hist iv 62), which appears to have been brigaded with Legion XIV at Neuss in AD 70[31].

Auxiliary units were brigaded with legions or legionary vexillations at a number of forts, such as Exeter, and Jericho and Adida during the Jewish revolt (BJ IV 486), and some legions seem to have been very closely associated with particular auxiliary units. Tacitus mentions eight Batavian cohorts attached to Legion XIV (octo Batavorum cohortes, quartae decimae legionis auxilia, tum discordia temporum a legione digressae, Hist.i 59). Because of the close association between legions and 'their' auxiliary units, the brigading of auxiliaries with legions is perhaps not surprising, and made sense strategically as well, especially if cavalry were among the auxiliary units. The presence of auxiliaries within the fortress at Neuss provides an explanation for the excess number of barracks in both stone phases; there are, it is claimed, 80 'infantry' barracks and 28 'cavalry' barracks in Stone I, 62 'infantry' and 27 'cavalry' in Stone II. 60/62 infantry barracks are required for a legion, depending on whether it had a quingenary or milliary first cohort, leaving 18/20 infantry barracks which are assigned to two milliary infantry cohorts by Koenen (1904). However, it is impossible to say whether the 20 infantry barracks in the praetentura are for auxiliaries or legionaries. Neuss does not have neatly arranged groups of barracks for each cohort as at Inchtuthil and as advocated in the de munitionibus castrorum (§ 2). The praetentura barracks may have contained other troops such as a vexillation from another legion, or possibly two milliary legionary cohorts of the type mentioned by Vegetius. However, the suggestion that they are for auxiliary infantry is perhaps the more likely. Attempts have been made to assign

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[31]The reconstruction of the complete fortress layout for Neuss is not entirely certain, so there is an element of doubt when attempting to reconstruct the garrison.

barrack blocks to the different legionary cohorts at Neuss but it is impossible to do this with any certainty other than with the first cohort, usually to one side of the praetorium/principia (DMC § 3; Inchtuthil).

On the whole, legionary fortresses tend to be more regular in arrangement than auxiliary forts, and this might suggest that perhaps legions did not very as greatly in size and internal organization as auxiliary units. However, Davison's study has shown that barrack block and contubernium sizes vary as much in fortresses as in auxiliary forts, and it is therefore impossibly to gauge from archaeological evidence alone whether a legion was above or below its theoretical strength.

Conclusions

Most of the evidence relating to the size and organization of army units suggests that both could vary considerably. The evidence of Livy and Polybius shows how greatly the strength of the Republican legion could be changed according to the contemporary military situation. This was either in response to a military emergency, or in preparation for a particular campaign. These variations in size appear to have had no effect on the organization of the legion. The information for the army of the Empire is much less detailed, but there is evidence to suggest that legion sizes could be increased during the Empire, or at least brought up to strength, either in reaction to an emergency, or in preparation for war[32]. Conversely, in areas of the Empire where there was no particular threat of warfare, units might remain under their theoretical strength. This would explain the relatively small discharge of veterans from Legion II Traiana, stationed in Egypt, in AD 157.

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[32]Slaves were conscripted into the legions in AD 9 after the Varian disaster (Annals I 31), and Legion VII Claudia may have been reinforced for Marcus Aurelius' Danubian campaigns (see above, note 13).

There is no reason why the same should not apply to auxiliary units as well as legions, and this would explain the overstrength centuries of Cohors I Tungrorum at Vindolanda and the centuries and turmae of Cohors XX Palymrenorum at Dura. In theory at least, one would expect a certain degree of regularity amongst the auxiliary units, especially since their size and organizational structure appears to be based on that of the legion (see above p.46). The de munitionibus castrorum assumes that all auxiliary units were of a standard size and type, but also provides the space allocations for the individual legionary, auxiliary infantryman and auxiliary cavalryman, possibly to enable a surveyor to calculate easily the space required for every unit, even those vastly overstrength or understrength, or with 'non-standard' organizations[33].

Vegetius hints at flexibility in the strength of legionary cohorts (II 6), and it would be possible to apply the rules of the de munitionibus castrorum to units which did not conform to the standard types described in the treatise. Bell (1965 410) states that one of the great advantages of the manipular and cohort systems was its great flexibility, and perhaps this included flexibility in the size and organization of the units as well.

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[33]For details of these space allocations, see chapter 4 on Marching Camps below.

Chapter 4: Marching Camps

Introduction

Roman marching camps, sometimes described as 'temporary camps', have been the subject of much discussion, particularly the attempt to identify camps and groups of camps with individual campaigns, especially those mentioned by the literary sources. As a result of this, the dating of camps has been considered by some to be of particular importance. According to Polybius, the Romans entrenched a camp each night (VI 41), and in the light of this statement, one might expect vast numbers of such camps to have been detected. Unfortunately whilst large numbers of camps have been recorded in Wales, Northern England and Scotland, very few have been detected in other areas of the Empire. This deficiency may be related to geological and agricultural circumstances or a lack of aerial photography; it is only comparatively recently, for example, that the work of Agache in north eastern France (1966 & 1970) has begun to reveal such camps in this area.

The descriptions by Polybius (VI 27-32) and Josephus (BJ III 86ff) are well known, though Polybius deals almost exclusively with the internal arrangements of the camp and that of Josephus is somewhat sketchy. Onasander provides surprisingly little advice on the subject, and it is from the de munitionibus castrorum and Vegetius that most of our information comes. Although the de munitionibus castrorum concentrates on the size and assignment of space within the marching camp, at the end the author provides details of the best location for a temporary camp and the different types of

defence. Vegetius covers the subject in two sections (I 21-25; III 8), frequently repeating his advice in the second section and elsewhere[1].

This chapter will consider the origins and development of the Roman marching camp, their locations and defence. This will be followed by a discussion of the internal arrangements of camps with particular reference to the space allocations advocated in the de munitionibus castrorum which has important implications concerning the size of armies occupying camps and series of camps.

The Origins of Marching Camps

Frontinus claims that Pyrrhus was the first to concentrate his entire army within the same fortifications in the field, and that after capturing his camp at Maleventum the Romans adopted his method of entrenchment (Strat.IV i 14). Livy agrees that Pyrrhus was the first to teach the art of castrametation (35 14). Plutarch, on the other hand, describes Pyrrhus' surprise at the Roman discipline and the arrangement of the Roman camp (Plut.Pyrrh.16). These conflicting accounts illustrate the difficulty of establishing the origins of the Roman marching camp and its introduction.

Polybius, who expresses great admiration for Roman military institutions in general, is particularly impressed by the organization and defence of the Roman camp (VI 26, 42; XVIII 18), and contrasts the Greek and Roman methods of entrenching.

> The Greeks, when they choose, think above all of the security they can achieve by exploiting the natural strength of position, first because they grudge the labour involved in entrenching, and secondly because they think that man-made defence are

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[1]I 22 and III 2, for example, both deal with suitable and unsuitable locations for camps.

> inferior to those provided by the natural features of the site. And so as regards the plan of the camp as a whole they are compelled to adopt all kinds of shapes to conform to the lie of the ground... with the result that everyone is uncertain as to the details of the camp and his own position in it. The Romans, on the other hand, prefer to undergo the fatigue of digging and other defensive preparations for the sake of having a consistent and uniform plan for a camp which is familiar to everybody.
>
> (Polybius VI 42)

The use of fortified encampments during sieges will be discussed below (see chapter 7 on Siege Warfare), and these are well documented from as early as the 9th century BC. The palace reliefs at from Nimrud illustrate Assyrian fortified camps; the representations are no doubt fairly stylized, but the camps are round, are fortified with turrets at regular intervals and appear to have a formalized internal arrangement with two roads intersecting at right angles in the centre. Thucydides mentions siege camps at Syracuse (Book VII), and other early examples of siege camps are discussed below (see chapter 7 on Siege Warfare).

The Persian camp at Plataea, however, was fortified with a wooden palisade to protect the Persian army and to provide somewhere to retreat should the Persians be defeated (Herodotus IX 15)[2]. Plutarch mentions that Iphicrates in the 4th century BC fortified his camps with ditch and palisade even when entrenching in allied territory (Moralia 187.2), and Polybius criticizes the Messenians for not bothering to find a favourable site for their camp, and failing to protect it with a palisade or trench (V 20)[3].

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[2]Some of the defeated Persian forces took refuge in this encampment and succeeded in keeping the Spartans out until Athenian reinforcements arrived (Herodotus IX 70).

[3]Arrian criticizes the Illyrian king Kleitos for a similar failure which the author describes as an act of carelessness (Anab.1 6).

Xenophon's comments on encampments are particularly interesting. He states that it was a standard practice of the Assyrians to fortify their camp with a ditch (Cyropaedia III 3 26), and the statement implies that this may have been done on a nightly basis. Xenophon describes Cyrus' method of camping in detail. The king's tent was in the centre of the camp with various troops arranged in an organized fashion around it.

> Everything else was so organized that every one knew his own place in camp - both its size and its location... He himself (Cyrus) took up his position in the middle of the camp in the belief that this situation was the most secure. Then came his most trusty followers... and next to them, in a circle, he had his horsemen and charioteers... The hoplites and those armed with the large shields he arranged around all the rest like a wall.
>
> Xenophon Cyr. viii 3.

These observations are likely to be more relevant to Xenophon's own day than 6th century BC Persia, and he may perhaps have been influenced by contemporary practices or his own experiences in Persia. Despite this, the details of the careful arrangement of the camp are interesting and suggest that some logical method of camp organization was in use at this time, whether in Persia or Greece. Xenophon's contemporary Aeneas 'Tacticus' wrote a treatise on castrametation (Aen.Tact.xxi 2) which probably included advice on fortifications and internal arrangements as well as the disposition of guards and patrols etc. which he mentions.

The existence of such treatises in the 4th century BC suggests that Frontinus' explanation for the origin of the Roman marching camp may be more likely than Plutarch's, though in the absence of any archaeological evidence of 4th century BC temporary fortifications this argument can only be conjecture; Aeneas' work on castrametation may simply have been theory and never actually put into practice. The evidence catalogued above, however, suggests that Garlan is correct in implying that castrametation was not simply a Roman development (1972 158), though the rationalization of camp organization may

have been taking place earlier than Garlan's proposal of the Hellenistic period. Keppie (1984 38) sees the possible influence of town planning on the lay-out of Roman camps and Josephus incidentally compares the Roman camp to a town mushrooming up (BJ III 86)[4]. This would not confine the development of regular camps to the Roman period as there are plenty of planned Greek colonies (eg: Miletus, Priene), and although Polybius criticizes the Greek practice of camping on easily defendable hilltops and therefore being unable to organize their camps properly (see above p.60), the examples of Priene, Knidos and Soluntum illustrate that a regular plan could be imposed even on a steep slope (Owens 1991 64-66).

Although Livy mentions Roman fortified camps as early as 480 BC (II 47), as Keppie points out (1984 38) there is no securely dated evidence for Roman camps before the mid 2nd century BC, and the earliest of these do not have the regular rectangular or square fortifications of the later camps so common in Britain (see below p.75). The camps at Renieblas may, indeed, illustrate the development of the temporary camp from the Greek defended hilltop to the standard rectangular form of the Roman period. The defencesof the earliest camps at Renieblas (I-III), dating to the mid 2nd century BC, follow closely the contours of the hill and so have irregular outlines. However the later camps (IV-V), which may date to the campaigns against Sertorius in the 80s BC, are fairly well surveyed rectangles, camp V enclosing the fairly steep S.W slope of La Gran Atalaya. Although Polybius' description of the Roman camp suggests a square or rectangular outline, this would not necessarily be the case on uneven terrain, and it is certainly not so at Renieblas. Although the

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[4]Vegetius also compares the marching camp to a fortified city (I 21). Others consider the influence of military architecture on towns, though more with reference to the forum/basilica complexes of North Western provinces (cf: Wheeler 1964 114).

absence of reliable data precludes any firm conclusions concerning the origins and introduction of the Roman marching camp, it seems likely that as with many other military procedures, the Romans adopted and adapted techniques which might be of use, for which Arrian praises them (Tact.33).

Site

The comments of the treatise writers and the frequency with which historians mention the site of temporary camps indicates the great importance placed by the Romans on choosing a suitable place to camp. The ability to choose a campsite is one of the ubiquitous assets of the good general[5]. Despite the obvious importance of the siting of temporary camps, modern studies tend to give little attention to the topic[6].

According to the treatise writers, the temporary camp should be near to supplies of wood and grain (Polyb.VI 27; Veg.I 22), and to a water supply (DMC § 57; Veg.I 22), but it should not be on marshy ground or on land liable to flood (DMC § 57; Veg.II 2 & 8). The site should be healthy, particularly if it is to be occupied for more than a few days (Onas.viii; Veg.I 22; III 2), and Vegetius advises against remaining too long in the same camp because the air and water will become polluted (III 2). The camp should be on a rise or plateau above the level of the plain (DMC § 56) and should not be overlooked by a higher place (DMC § 57; Veg.I 22), or near to forests, gullies or valleys

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[5]An ability that is ascribed to Caesar (Cicero Pro Rab.42), Vespasian (Hist.II 5), Agricola (Agric.20) and Hadrian (SHA Hadrian X 6) among others.

[6]Hanson deals with the subject in a couple of sentences (1978 141) whilst neither Collingwood & Richmond (1969 chapter 2) nor Wilson (1974) mention the subject.

which might assist the enemy in a sudden attack (DMC § 57)[7]. The porta praetoria should always face towards the enemy (DMC § 56; Veg.I 23), or down any slope (DMC § 56), or in the direction of the intended march (Veg.I 23).

Appian sums up all this advice very neatly in his comparison of the camps of Brutus and Cassius with that of Antony before Philippi (BC IV 107):

> The former (Brutus & Cassius) were camped on high ground, the latter (Antony) on the plain; the former procured fuel from the mountains, the latter from the marsh; the former obtained water from a river, the latter from wells freshly dug; the former drew their supplies from Thasos, requiring carriage of only a few stades, while the latter was 350 stades from Amphipolis. Still it seems that Antony was compelled to do so as he did, for there was no other hill, and the rest of the plain, lying in a sort of hollow, was liable to flood at times.

One imagines that this camp would come under the de munitionibus castrorum's category of 'mother in law', but the passage indicates the main points of a good and a bad campsite.

Although the treatises recommend camping near to supplies of wood, grain and water, it is the latter that appears to have had the most importance. Ramparts were occasionally constructed to secure the line between a camp and the nearest water supply (BC I 73; B.Hisp.13), and commanders seem to have made every attempt to camp near a water supply. Labienus harassed Caesar's army whilst on the march to force him to camp where there was no water (B.Afr.69), and later in the same campaign Caesar was obliged to camp further from the enemy than he wanted to for lack of an adequate water supply (B.Afr.79). On the other hand, Marius is supposed to have deliberately

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[7]Camps in such positions are termed novercae, 'step-mother' by Hyginus, though perhaps 'mother in law' would be a more appropriate translation. Such positions should be avoided if at all possible.

chosen a site for his camp some distance from a water supply to encourage his soldiers to fight (Plut.Mar.18).

Clearly access to an adequate water supply was of great importance in choosing a camp site, perhaps of primary importance, overriding other factors such as proximity to the enemy (eg: B.Afr.79). However, there were other important topographical features that had to be considered. The dangers of camping too near land liable to flood are illustrated during Caesar's campaign in Spain when he camped between two rivers which then flooded and cut his army off for several days (BC I 18), and also during the revolt of Civilis (Hist.V 24). Here the Romans appear to have had no choice but to camp on flat ground and when the Rhine flooded the camps were washed away. Rivers, however, could also be used to provide additional security for camps and to bring in supplies (BG II 5).

The treatise writers also warn against camping too near to forests, gullies etc. and Hanson (1978 141) considers the labour involved in forest clearing for the construction of temporary camps. Some generals attempted to get away without providing for this extra security, most notably Caesar. He was twice taken by surprise by the Gauls (BG III 28) and Germans (BG VI 37), because he was camping on the edge of a forest and the enemy were able to advance under cover.

Historical sources frequently mention that a temporary camp was protected by the nature of the ground (eg: BG V 57; BC II 31; B.Hisp.28; Hist.III 9), and this no doubt refers to the rise or plateau recommended by the treatises. When the topographical surroundings of a camp are mentioned by a writer, it is usually the case that it is situated on a rise (eg: BG II 8; BG III 19; BC III

37). Caesar mentions that one camp was on high ground at the top of a gentle slope a mile long (BG III 19), so when the Gauls attacked it and charged up the hill, they were too exhausted to fight properly. Livy mentions one camp situated beneath a hill (44.3) which the treatises do not recommend, but the higher ground had been captured, and was presumably secured with a small garrison to ensure the safety of the camp below.

The archaeological evidence for the most part illustrates very well the advice in the treatises on the siting of marching camps. Figure i below provides certain details of particular marching camps[8]. Of the 51 marching camps for which adequate topographical data were available, 41 are stationed within very easy reach of a river or other water supply, and nearly half are on rising ground beside a river or other water supply, as the treatises recommend. Thus an easily defendable site and good visibility are ensured as well as the water supply. Those camps without a water supply immediately available are generally not too distant from a supply (eg: Rey Cross, where the camp is fairly close to a steep sided river valley). Marching camps in Wales are usually situated on plateaux to ensure good visibility on all sides. Here, therefore, camps are further away from water supplies (eg: Y Pigwn, Ystradfellte).

A number of camps are on less easily defendable ground, usually in river valleys, eg: Bromfield and Marcus, but good visibility is still possible, and with a few exceptions such as Ythan Wells, camps are not overlooked by higher ground. However, it is often the case that the defence of temporary camps are

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[8]Many of these camps were chosen in the first instance because the various archaeological reports provided details of dimensions of defences. The remainder were picked on the basis of sufficient information being provided in the archaeological reports for analysis. For bibliographical references for these sites, see below fig.i.

extended to maximize the defensive potential of the ground. As a result, camps are not always of a regular shape, though some slightly irregular plans have been put down to surveying errors rather than for the purpose of enclosing particular ground[9]. The irregular defence of the Republican camps at Renieblas have been discussed above (see above, p.63), and although the camp at Raedykes is much more regular in plan, there is an irregular extension in the N.E corner. According to Crawford (1924 108), this was to enclose ground that would strengthen the camp defence.

If it was not convenient for a camp to occupy high ground nearby, this might be partly enclosed by the camp as at Esgairperfedd, or fully enclosed within an annexe, eg: Little Kerse. Most camps, however, seem to have been sited to enclose any high ground or knolls within the immediate area, such as Ardoch III and Dolau. This is the case at Renieblas, and although here the camps were above rivers on two sides, additional precautions were felt necessary to secure the water supply. An annexe of Camp III enclosed a knoll overlooking the Aldehuela river to the south, and in addition covered a steep sided gully which might otherwise have enabled an enemy to approach unseen. Communications between camp IV and the river Merdancho to the west of the site were ensured by a bracchium, noted by Schulten (1929 144-5)[10].

As stated above, there might be other factors which could influence the position of marching camps beside the importance of occupying a rise above a river. Camps could be sited to command river crossings and fords, valleys and mountain passes, eg: Ystradfellte and Pen-y-Gwyrd, commanding valleys; Rey Cross on the main line of march over the Pennines; Wooden near the

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[9]Eg: Pennymuir C, PSA Newc[4] vii (1935-6) 107-12.

[10]Probably the bracchia used by Caesar were similar (BC I 73; B.Hisp.13).

confluence of two major rivers, and Annan Hill, Eskbank, Kintore and Wandel, beside important rivers, probably river crossings. In some cases a conflict might have arisen between occupying high ground for improved defence or to command a pass, and being close to a water supply. The literary and archaeological evidence suggests that this was not a common occurrence, for it seems that in such cases a compromise would be made. Additional defence might be provided to secure the water supply (eg: Renieblas camps III and IV, BC I 73; B.Hisp.13), or to enclose higher ground and protect against surprise attacks (eg: Renieblas camp III; Little Kerse).

On the whole it is impossible to determine whether tree clearance took place if necessary during the construction of marching camps. This may have been the case at Ystradfellte, indicated from the results of pollen sampling (RCAHM Brecknock), but this is the only site for which such information is available. Finally, although a couple of the camps considered enclosed some marshy ground, this seems to have been generally avoided wherever possible[11]. However, marshy ground is generally avoided because, in keeping with the advice of the treatises, marching camps are usually situated on higher ground, usually hills or knolls, above rivers.

Camp defences

Polybius, Onasander and Josephus provide few details about camp defence, other than fairly general statements about the use of a rampart or palisade and ditch. It is the de munitionibus castrorum and Vegetius who describe the defence in detail, both writers indicating that these varied according to the potential danger and the type of soil. The de munitionibus castrorum suggests

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[11] Arosfa Careg, Esgairperfedd and Chew Green III all enclose marshy ground in one corner, though in each case this seems to be through lack of space.

five methods of protection for a camp; ditch, rampart, stakes, stockade and lines of armed men (DMC § 48). The last three are used if the soil is too friable for the construction of a regular rampart or ditch (DMC § 51-53). The author suggests that in a secure place, a single trench or a single row of armed guards was sufficient (DMC § 52) and this seems to be to maintain discipline as much as security.

The ditch, according to the de munitionibus castrorum, should be 5ft wide and 3ft deep, and either V-shaped or Punic, whilst the rampart of turf or rubble should be 8ft wide and 6ft high. Additional defences were provided at the vulnerable gateways by the sanctum and titulum, a short stretch of rampart and ditch covering each entrance 60 ft in front of it, and by claviculae, extensions of the rampart following an arc around part of the gateway[12].

Vegetius lists the different dimensions of rampart and ditch in two sections (I 24; III 8) and these are the only camp defence he considers. The various dimensions are tabulated below, along with those of the de munitionibus castrorum and Josephus for comparative purposes. The ramparts were topped by a palisade of pointed stakes (I 24; III 8) or wooden caltrops (III 8)[13]; the strong wooden stakes used presumably for either method were carried by the soldiers (I 24). Vegetius notes that the Persians, who copied the Roman camp, carried empty bags so a rampart of sand bags could be made if the camp was in a sandy area (III 10) and it seems quite likely that the Romans too would have carried empty bags to fill with sand and construct a rampart in desert conditions. Finally, Vegetius twice mentions that if the camp is being

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[12]The interpretation of the description of the clavicula in the de munitionibus castrorum is disputed; see below pp.76-78.

[13]See above pp.60-64 for origins of marching camps, and below pp.78-80 for palisade stakes.

pitched near the enemy, all the cavalry and part of the infantry should be drawn up in battle line to protect those entrenching (I 25; III 8), and includes a quotation from Virgil on the same matter[14].

Table illustrating recommended dimensions of defences[15].

	BJ III	DMC	Veg.i	Veg. ii[16]	Veg. iii[17]	Veg. iv[18]
Ditch depth	6ft	3ft	7ft	9ft	3ft	
Ditch width	6ft	5ft	9ft	12ft	5ft	9-17ft
Rampart height		6ft	3ft	4ft		
Rampart width		8ft				

The practice of entrenching camp behind a protective screen of infantry and cavalry seems to have been a standard procedure for a Roman army entrenching in the presence of the enemy. The number of times Roman armies were attacked whilst entrenching illustrates the vulnerability of an army engaged in this labour (BG II 19; BG III 28; Appian BC V 110), and Tacitus explains why:

> Even entrenching camp was a perilous business in such close proximity to the enemy, for there was the threat that scattered parties of men engaged in digging would be thrown into disorder by a sudden sortie.
>
> Hist.III 26.

The standard practice seems to have been for the first two lines of the triplex acies to be drawn up for battle whilst the third line fortified the camp (BG I 49; BC I 41; B.Afr.51).

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[14]Veg.I 19; the quotation is from Georgics III 346-8.

[15]For discussion of the archaeological evidence, see below p.74 and graph, p.75.

[16]For camp likely to be attacked.

[17]For ditch dug in friable soil.

[18]Camp for long-term occupation (summer or winter).

Commanders who failed to entrench their armies at night were often criticized by ancient writers (Appian BC IV 130; Hist.IV 75), and the general criticisms of the Roman army in Africa before the arrival of Metellus included a comment that the camps were not fortified (Sallust Jug.45)[19]. Vegetius states that learning to entrench a camp was one of the most important aspects of a recruit's training (Veg.I 21). Practice camps are well known in Britain, particularly in Wales, at Landidrodd Common and Tomen-y-Mur, and Hadrian's adlocutio also indicates that camp building was a fairly common military exercise (CIL VIII 2532/18042 = ILS 2487). However, since Davies (1968) has dealt comprehensively with the subject of practice camps, I do not intend to consider them here.

The treatise writers suggest that the strength of marching camp defence depended on the proximity of the enemy, and whether the camp was in friendly or hostile territory, and there is a hint in the other literary sources that this may have been the case. Sallust mentions that when Metellus was bringing the demoralized African army up to scratch, camps were entrenched every night, and each one was fortified "with a rampart and trench as if the enemy were close at hand" (Jug.45)[20]. This statement could mean that defence were generally more substantial when entrenching near to the enemy, as Vegetius recommends, or that defence such as a rampart and ditch might not be necessary when camping in friendly territory or a secure place, as the de munitionibus castrorum suggests (DMC § 52). The latter seems to be the more likely explanation in the light of Appian's criticism of Antony for camping without palisade and ditch "as though he were camping alongside a friend" (BC

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[19]Greek commanders were criticized for the same failing, see above p.61.

[20]iuxta ac si hostes adessat; the agmen quadratum was used under the same circumstances - see chapter 5 on The Order of March.

III 83). Although some generals like Iphicrates clearly played it safe (see above p.61), it seems from this evidence that armies may not have entrenched a camp every night, if they were in friendly territory or a secure place.

This could be one explanation for the absence of marching camps in some areas, particularly in southern and south western Britain where Legion II Augusta is known to have campaigned in the early years of the Roman occupation. St Joseph (1958 94) explains the absence of camps in these areas as the result of destruction through agriculture and building, and the failure of some of the soils in these areas to produce crop marks. However, it is possible that in the territory of pro-Roman or client kings, marching camps may have been considered unnecessary. This would not explain the absence of marching camps in other areas of southern Britain, but the possibility must not be dismissed that the camps in these areas may have had very slight fortifications or simply a palisade (DMC § 48) if there was not felt to be much of a threat from the enemy. Roman armies do seem to have camped with slight fortifications or none at all (see above), and Tacitus states that one of Germanicus' camps in Germany had earthworks to front and rear, but only palisades on the sides (Annals I 50). A palisaded line of defence would be unlikely to leave any archaeological trace.

The three main forms of defence for a camp were the rampart and ditch, the additional protection of titulum or clavicula for the vulnerable gateways, and the palisade[21]. Historians generally provide few details about these defence with the exception of the palisade stakes, about which both Polybius and Livy include a long excursus (Polybius XVIII 18; Livy 33 5; see also p.70 & pp.78-

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[21]Because of the lack of accurate archaeological data concerning rampart dimensions, I do not intend to discuss this matter here.

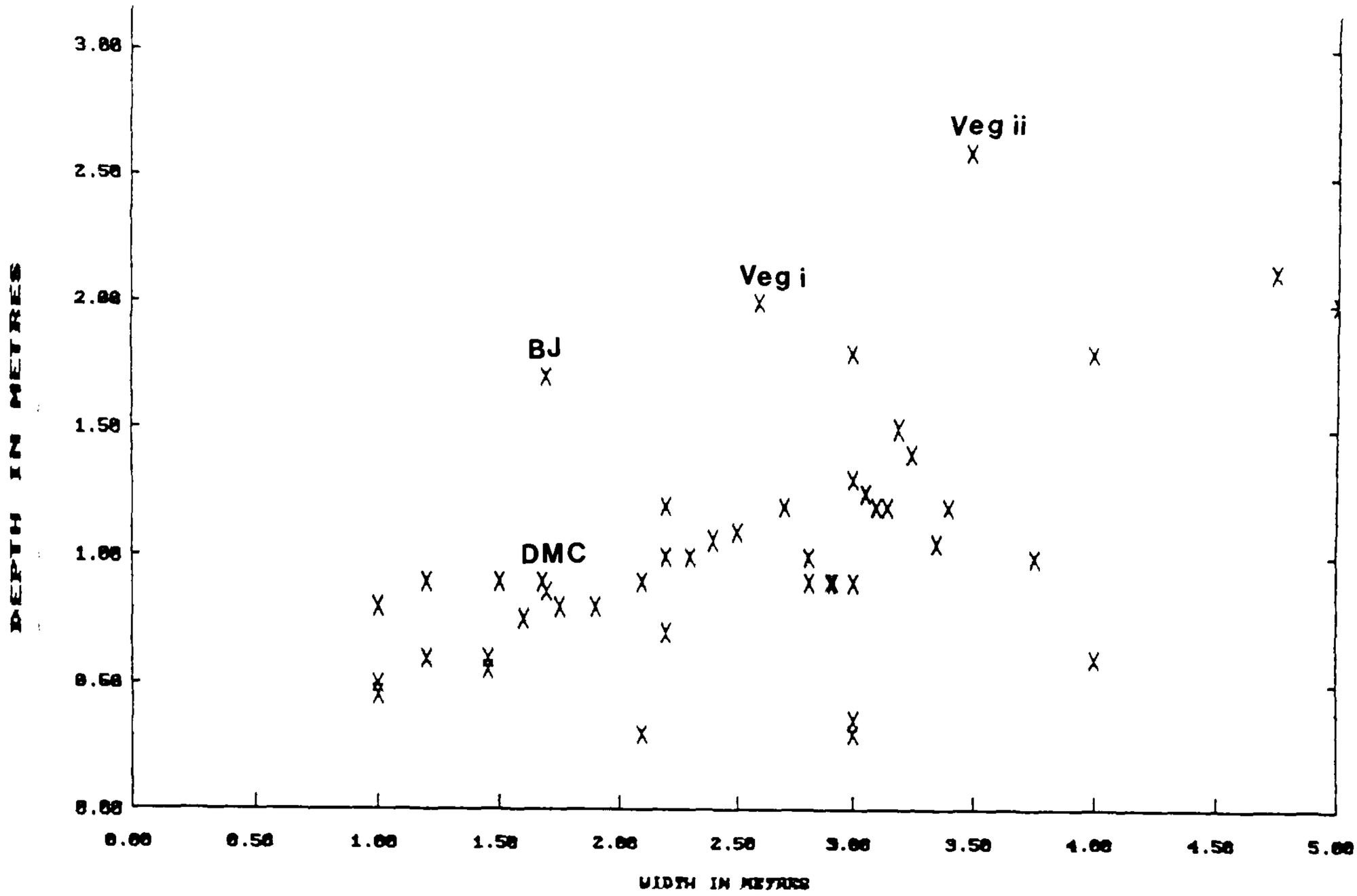
80). Caesar only twice mentions the width of his camp defence (BG II 5; BC I 41), and at 18ft and 15ft these are much wider than most of the recommendations tabled above. However, in both cases, Caesar may have expected an attack upon his fortifications, and this seems very likely in the latter case where his troops entrenched behind a protective screen because of the proximity of Afranius' army.

With the archaeological evidence, of course, it is impossible to know the circumstances under which the camps were constructed, and the geological nature of the site could also have a considerable affect on the dimensions of trenches. At Carlops, Durno, Little Clyde, Malham and Rey Cross the ditches are not continuous or are much shallower than elsewhere because of solid rock near to the surface, whereas at Gogar Green the dimensions of the ditch vary because of the soil on which it stands. On the clay of the western side, the ditch is fairly small, whereas on the sandy north eastern side, the ditch is wider and deeper, because of the more friable nature of the soil.

Although Richmond states that the ditches of semi-permanent camps were larger (Collingwood & Richmond 1969 14), in the light of the possibilities in variation mentioned above, it is not possible to identify a camp as semi-permanent solely on the size of the defence. Secure identification of such camps should, perhaps, be based on other features such as lines of rubbish pits and the presence of ballistaria as much as on the size of the defence.

Almost all trenches of marching camps which have been examined are V-shaped, though there are a couple which are flat-bottomed, such as Finavon and Ardoch III, whilst that at Dunning is U-shaped. The use of the Punic ditch has never been recorded in the defence of a marching camp, and the only

two examples known are from the forts at Hod Hill and Cawthorn D (Collingwood & Richmond 1969 p.13).



Graph to illustrate depth and width of camp trenches.

The dimensions of marching camp trenches vary considerably, even bearing in mind the affect differing soil types might have. With a few exceptions, where ditches are particularly shallow, most ditches are 0.8-1.5 metres deep, around the 3ft recommended by the de munitionibus castrorum, or deeper, but almost all the ditches are much wider than the 5ft recommended in this treatise. In a large number of the examples, the width of the trench is approximately twice its depth, giving a ratio of 2:1 rather than the 1.6:1 ratio suggested in the treatise[22]. A comparison of the archaeological evidence with the advice in the literary sources suggests that, with the exception of the de munitionibus castrorum and Vegetius' figures for a ditch in friable soil, the recommended dimensions of ditches are considerably larger than what Roman commanders obviously thought was safe. The only examples with defence

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[22]Because of erosion of the edges, many of these ditches were probably originally wider so these ratios of width to depth may originally have been closer to that recommended by the treatises.

anywhere near the sizes suggested by Josephus and Vegetius (i & ii) are Bernhardsthal and Kollnbrunn on the Danube and Liercourt-Erondelle in France. It may be the case that those on the Danube, which have been dated to the Marcommanic wars, were more likely to have come under attack than any camps in Britain at any time, but because of the tiny sample available for this area, it is impossible to argue this with any certainty.

The de munitionibus castrorum is the only treatise to describe the additional gateway defence that could be used (DMC § 49-50; 55). The design of the titulum is straightforward, but the description of the clavicula is somewhat ambiguous;

> The clavicula is traced round a circle from a line on the inside of the rampart from a point in the middle of the gate, the compasses wide open to the edge of the gate; from this centre point you draw an arc in front of the road following the same line which is fixed at the centre of the gate. Then with the compasses in the same place you add the width of the rampart and draw another arc on the same line so that those going in are always unprotected and those coming in a straight line are kept out. DMC § 55

Lenoir (1979 89-90) believes that the writer is referring to a double clavicula, with extensions of the rampart on the interior and exterior of the camp, and that these extensions were an arc of 90 degrees. He dismisses the reconstructions of Domaszewski (1887 Tafel 1 fig.8) and Stolle (1912 fig p.119), both of which are single internal claviculae with a continuation of the trench along the rampart extension. According to the de munitionibus castrorum the clavicula, unlike the titulum, is an extension of the rampart only; the ditch is not extended around the arc as Domaszewski and Stolle suggest.

Lenoir (1979 § 93) admits that his interpretation of the clavicula would not allow the additional defence of the titulum although the de munitionibus castrorum clearly refers to the use of both clavicula and titulum simultaneously. The use of a single internal clavicula could, however, easily be used in

conjunction with a titulum, although this is very rare[23]. The suggestions of Domaszewski and Stolle, therefore, would appear to be the most likely reconstructions of the gateway defence described in the de munitionibus castrorum, and not Lenoir's double clavicula. The only ambiguities in the paragraph would appear to be whether the clavicula is internal or external, and the length of the rampart extension traced around the circle mentioned by the de munitionibus castrorum. Since Lenoir suggests external clavicula and titulum could not be easily used simultaneously, it seems reasonable to suggest that the treatise is referring to an internal clavicula and titulum.

Analysis of the gateway types of the camps included in the survey shows that the single internal clavicula was the most frequently used type, and Lenoir's own study of gate types confirms this (1977 tab 1). External claviculae in marching camps are comparatively rare (eg: Troutbeck 3, Dalswinton 2), and double claviculae even more so (Troutbeck 2). Lenoir (1979 88) admits that Stolle's interpretation of the internal clavicula is very similar to the archaeological traces of these gate types. Stolle no doubt used the archaeological evidence to try to explain the description in the de munitionibus castrorum, though as stated above, on the evidence of this treatise alone, the interpretations of either Stolle or Domaszewski may be correct.

As stated above, use of an internal clavicula and titulum is extremely rare and it might be considered slightly odd that this should be advocated by the treatise. However, there does seem to have been a certain amount of experimentation in the design of fort and camp gateways in the later 1st

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[23]Lenoir cites only two examples - Glenwhelt Leazes and Chapel Rigg (1979 90-91), both of which may be practice camps (Wilson 1974 344). Chew Green IV also has both titulum and internal clavicula, though Richmond (1934 50-61) identified this as a semi-permanent camp.

century AD (eg: Newstead, Crawford, Stracathro type entrances), and since the de munitionibus castrorum claims to be propounding an innovative method of camp organization (§ 45), there seems no reason why the treatise should not also suggest a new type of gateway defence[24].

Additional defence could be provided by the use of wooden palisades, mentioned by the de munitionibus castrorum and Vegetius (see above p.70). Polybius and Livy both describe the wooden stakes and their use, and although the latter's description, being based heavily on that of Polybius, is not the primary one, it is slightly clearer:

> The Romans cut light forked stakes with three or perhaps four branches, as a general rule, so that each soldier could comfortably carry several at once, with his arms hanging on his back; and they plant them so close together and interweave the boughs so completely that it is difficult to tell to which branch each trunk is joined or to which trunk each branch belongs. Moreover, the branches are so sharp as to leave, interlaced, little space for inserting the hand, so that there is nothing that can be grasped and pulled out, since the interwoven branches bind one another together; and, if one is by chance pulled out, it leaves a small gap and is easily replaced.
>
> Livy 33.5.

Various sources mention soldiers carrying bundles of wooden stakes or valli (Livy Per.57; Dio xvii 63; Cicero Tusc.2 16); Scipio's soldiers at Numantia carried 7 valli each (Livy Per.57), specifically for use in the entrenchment of camps (Cicero Tusc.2 16). Caesar, on the other hand, mentions that materials for a camp stockade would have to be fetched from a considerable distance (BC I 42), and it seems possible that soldiers did not always carry materials for the palisade with them.

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[24]The use of the internal clavicula and titulum together on a few practice camps (Llandidrod Common xvi, Chapel Rigg, Glenwhelt Leazes) may simply have been to give the troops practice with both types of defence since there seems little doubt that they were in use at the same time (St Joseph 1958 93; 1969 114).

Bennett (1982) discusses the identification of the wooden stakes erroneously identified as pila muralia, and I shall not repeat his discussion of the various explanations here[25]. Bennett believes the stakes are for use in camp or fort defence, either as an additional gateway defence or as a type of palisade in the form of the wooden caltrops mentioned by Vegetius (1982 204; Veg.III 8). As a type of palisade, they could be used in addition to the rampart, or to defend a camp without rampart and ditch if, for example, the soil was too friable for these (DMC § 51-53), or a camp of the type Germanicus is reported to have used in Germany (Annals I 50).

How they were actually used is difficult to determine, though Bennett explains how they could easily be tied together in twos or threes to provide a spiked obstacle that any attacker would have to negotiate (1982 204). These may have been positioned in gateways, as Bennett suggests, or on ramparts as Vegetius describes (III 8). Bennett states that "three stakes of the Great Chesters type, lashed together at the central 'grip' would prove an effective temporary fence or picket, which could not easily be moved and yet would prove easy to erect and dismantle after use" (1982 204).

Although Bennett rejects the suggestion that the stakes were palisade stakes (1982 203), I believe that they may well indeed be a prefabricated version of the valli or palisade stakes described by Polybius and Livy and mentioned by several other authors; such stakes would have been much easier to carry in bundles than the branches described by Polybius and Livy. Vegetius' caltrops (III 8) do form the palisade on top of the rampart, and these would create an affect similar to that of barbed wire, though Bennett is no doubt

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[25]For a description of these objects and their identification as pila muralia, see chapter 7 on Siege Warfare.

correct to dismiss the use of these stakes as being simply thrust into the rampart and tied together (1982 203), as others have suggested (Webster 1985 173; Junkelmann 1986 fig.18 p.228; Le Bohec 1989 fig 19) and which are unlikely to have provided a very solid protection.

Proportions of camps

The length to width ratio of a marching camp should be 3:2 (DMC § 21; Veg.III 8). The de munitionibus castrorum and Josephus both recommend a rectangular shape for the camp (DMC § 21; BJ III 86ff), and that of Polybius is either square or rectangular, depending on the number of legions encamped (Polyb.VI 32). Vegetius, however, although advocating the 3:2 length to width ratio mentioned above, states that the camp could be square, triangular or oval (I 23), or square, round, triangular or oblong, depending on the topography of the site (III 8).

The influence of the topography of the site on the shape of marching camps has been discussed above (p.68), and although irregularities in the shapes of marching camps are frequent, it is only in the earliest examples that the lines of defence are totally dictated by the topography and contours of the site (eg: Renieblas, see above p.63). Vegetius gives the same advice when discussing the siting of towns (IV 1-2), and his statement about camp shapes may be influenced by the emphasis on defence that pervades his work. This may also explain the greater dimensions of ditches that he recommends.

The majority of marching camps are for the most part fairly regular squares or rectangles. Wilson (1974 343) states that Flavian camps tend to be square in proportion, though he does point out that there were exceptions. The series of 120 acre camps dated by Hanson (1987 132-3) to the Agricolan

campaigns in Scotland are all roughly rectangular with a length to width ratio near the 3:2 recommended by the treatises. Nine of the marching camps included in the tables below (fig.i) are square or almost square (length to width ratios of 1:1 or 1:1.1), and the same number have a ratio of approximately 3:2. The largest group has a length to width ratio of 1.2:1 (eg: Esgairperfedd and the two camps at Y Pigwn), and so appear to be slightly elongated squares. Interestingly, a number of legionary fortresses have approximately the same ratio (Caerleon, Neuss, Lambaesis), and Inchtuthil with its 1:1 ratio appears to be unique for a legionary fortress. Although the sample used was relatively very small, it appears that the surveyors of many marching camps did not use the 3:2 ratio suggested by the treatises.

The de munitionibus castrorum and the size of camps

The method of camp surveying and arrangement described by the de munitionibus castrorum is based upon the size of the army, so the overall size of the camp should be proportionate to the number of men and supplies, and Vegetius also suggests this should be the case (I 22 & III 8). The principal importance of this relationship between size of army and encampment is the defence of the ramparts when necessary; a camp perimeter could not be properly defended in times of desperation, for example following a defeat in a pitched battle (BC III 95, after Pharsalus; Hist.III 26-9, after the second battle of Cremona), if there were too few soldiers to hold the perimeter. Under normal circumstances it seems likely that the entrenched army would form up outside the camp if it came under enemy attack (BG III 19).

The sizes of marching camps, therefore, can provide some indications of the size of a particular army on campaign. However, historians have very differing opinions of the number of men per acre to be used in calculating the

strength of an army in this way. Hanson (1980 142-3) lists the different suggestions and also points out some of the problems in this exercise, including the number of cavalry, which required a larger assignment of space, and the inclusion of 'dead space' within camps. He does not mention one other possibility which might affect the density of troops in a marching camp, and that is an attempt by the general to deceive the enemy about the size of his force (eg: Onasander x 16; Front.Strat.I i 5), though one wonders whether such a ruse would be necessary in the fairly small scale warfare that seems to have taken place in Britain. The suggestions range from 240 men per acre (Roy's interpretation of Polybius) to 480 (Grillone's of the de munitionibus castrorum). On the basis of the presumed internal lay-out of Rey Cross, Richmond suggests 300 men per acre (Collingwood & Richmond 1969 11) whilst Hanson prefers 380 per acre, based on the space allocation for one legion in the de munitionibus castrorum.

According to the de munitionibus castrorum, the legionaries, auxiliary cavalry and auxiliary infantry all received different space allocations within the camp (DMC § 1; 16; 25) which Maxwell (1981 48) seems to ignore completely when he suggests the legionaries and auxiliary infantry received the same allocation. It has been suggested that the camp at Rey Cross held one legion and a vexillation (Richmond & McIntyre 1934 50-61), and a legion with "an additional complement of auxiliaries, partly no doubt cavalry" (St Joseph 1983 24), whereas the 58 ha (143 acre) camp at Durno has been described as representing "a concentration of almost overwhelming force" (St Joseph 1978 281) and has been identified by St Joseph as the possible site of Mons Graupius. Because the basic internal arrangements of camps can be traced by the extension of the interior roads from the gateways, it is possible to apply the

rules of the de munitionibus castrorum to them, and Rey Cross and Durno are suitable examples. For explanations of the figures, see figure ii below.

Rey Cross (7.53 ha, 18.6 acres)

Total forces:	Infantry	Cavalry	
1 legion with ∞ 1st coh	5120		
1 ala ∞		720	
1 coh eq ∞	800	240	
1 coh eq	480	120	
2 coh quing	960		
scouts	200		
Total:	7560	1080	= 8640

Density of troops per acre = c.460[26].

Durno (58 ha, 143 acres)

Total forces:	Infantry	Cavalry	
2 legions with ∞ 1st coh	10240		
15 cohort vexillation with 2 ∞ 1st cohorts	7840		
1 ala ∞		720	
11 quingenary alae		5632	
1 coh eq ∞	800	240	
17 quingenary coh eq	8160	2040	
5 milliary infantry cohorts	4000		
25 quing. infantry cohorts	12000		
marines	600		
scouts	200		
guards	160		
equites singulares		600	
pedites singulares	300		
Total	44300	9232	= 53532

Density of troops per acre = c.374[27].

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[26]It should be noted that for ease of comparison Imperial measurements are used during discussion of density of troops in marching camps.

[27]Because of the irregularity of Durno, to facilitate the calculations, the size of each plot has been reduced to the largest possible square that could fit, thus plot 5, with dimensions of 600 x 800 x 840 x 880 ft has been reduced to a 600 x 800 ft area. This has resulted in approximately 15 acres of unused ground within the camp; thus the density of troops could actually be much higher (up to c.415 per acre). Hassall believes Durno may be Severan because of its huge size (pers.comm.), but Durno is 1.5 times the size of the camp in the de munitionibus castrorum which contains the (probably theoretical) army of an imperial campaign, and so is large even by such standards.

According to these theoretical reconstructions, therefore, Rey Cross could have held one legion with a number of auxiliary units, including cavalry, perhaps not an unreasonable force for an army based on one legion on campaign. Durno, however, according to the same theories, could have held almost the entire known garrison of Britain of the Hadrianic period. Although by this time (AD 122) one legion plus accompanying auxiliaries had been withdrawn, it seems hard to believe that almost the entire army of one province would be concentrated on one campaign, leaving a bare handful of units to garrison the whole of the rest of the province, much of which was barely consolidated territory[28].

It is conceivable that the reconstruction of the camp defences at Durno is wrong, and that fragments of the defences of more than one camp have been reconstructed to form one giant camp of unrealistic size. However, the defences of camp III at Ardoch are fully known and at 48.6 ha, this is 1.3 times the size of the de munitionibus castrorum camp. Like Durno, Ardoch III could have held a very large army (up to c.50,000 assuming a density of c.400 per acre) and again this seems unlikely.

Grillone's calculations of the density of troops per acre from the de munitionibus castrorum are correct; the hypothetical army in this treatise is c.41,000 and the camp c.86.3 acres, giving an exact figure of 475 men per acre. However, although the reconstruction of Rey Cross may be acceptable, that of Durno seems improbable, leading to the suggestion that the space

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[28]The AD 122 diploma (CIL XVI 64 lists 1 milliary ala and 12 quingenary, 3 milliary cohorts and 34 quingenary. My reconstruction of Durno has 1 milliary ala and 11 quingenary, 6 milliary cohorts and 42 quingenary.

allowances advocated by the de munitionibus castrorum are unrealistic[29]. In practice, it seems likely that troops camped much more spaciously than suggested in this treatise, even though this meant fewer men per length of rampart should the camp have to be defended[30].

Units camped in permanent fortifications received a much more generous allocation of space, eg: Inchtuthil c.100 men per acre (240 per ha), Fendoch c.200 per acre (530 per ha), Heidenheim 60 per acre (150 per ha)[31]. However, other than proving that cavalry required about twice as much space as infantry, as implied by the de munitionibus castrorum, this is of little use when attempting to establish the number of troops in a marching camp. Clearly there was some relationship between size of camp and size of army (Onasander x 16), but one can only guess at the density of troops per acre. Any figure from 300 to 350 per acre seems reasonable. What does seem likely is that the theory propounded by the de munitionibus castrorum concerning the density of troops in marching camps was not practised in the field.

Conclusions

There is a clear agreement between the treatises and the other evidence, both literary and archaeological, concerning the situation of camps. The treatises advise that camps should be situated on rising ground near to a water supply

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[29]These allocations are as follows: legionary 5 yds^2, auxiliary infantry 4 yds^2, cavalry 10 yds^2.

[30]However, since in the examples given there would be 12.2 cm of rampart per man at Rey Cross and only 3.05 cm per man at Durno, this would not seem to be a serious problem.

[31]Assuming that the presumed units at these forts & fortress are at full theoretical strength. These figures give 50 yds^2 per man at Inchtuthil, 22 yds^2 at Fendoch and 111^2 at Heidenheim. Thus the cavalry at Heidenheim do receive double the legionary allocation at Inchtuthil which is proportionate with the figures suggested in the de munitionibus castrorum.

and not overlooked by higher ground. The archaeological evidence and statements in other literary sources prove that for the most part these factors were taken into consideration when a campsite was chosen. Although the treatises stress the importance of these precautions they are fairly obvious steps in locating the safest and most convenient campsite and would always have been considered essential. Indeed, choosing the location for to camp is one of the standard qualities of a 'good' general[32]. It would seem likely that the treatises are simply repeating well known advice, not suggesting anything new.

The literary sources and treatises suggest that the strength of a camp's defence depended on the proximity of the enemy and the likelihood of an attack. The de munitionibus castrorum also mentions the difficulties of digging trenches in rocky ground and the evidence of camps such as Rey Cross, Durno and others (see above p.74) indicates that trenches were only dug when the ground allowed it. Although the dimensions of ditches vary considerably and are frequently greater than those recommended in the de munitionibus castrorum, because the circumstances concerning the entrenchment of each camp cannot be known, it is impossible to make any firm conclusions on this matter. There cannot be any reflection in the archaeological record of the variations in camp defence which might occur if the enemy were present or not.

Problems in interpreting the description of the clavicula in the de munitionibus castrorum do not facilitate comparison of the theoretical and archaeological types. I believe this gate type is a single internal clavicula, the most common

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[32]Caesar, Vespasian, Agricola and Hadrian are among those who chose camp sites personally, see above note 5.

type of clavicula found in temporary fortifications in Britain and other provinces[33]. However, it is very rarely found in conjunction with a titulum as the de munitionibus castrorum suggests. It may well be that, as with the method of camp arrangement, the treatise is suggesting a new type of gateway. The additional defence of caltrops mentioned by Vegetius may be represented by the wooden stakes generally known as pila muralia, but their use is disputed and can only be suggested.

As far as camp size and organization is concerned, many forts and camps do agree with the 3:2 length to width proportions suggested by the treatises, but the theory propounded in the de munitionibus castrorum concerning the encampment and particularly the density of troops has been shown to be unlikely. Although there was obviously some correlation, however rough, between size of camp and size of army, it is impossible to assess accurately the size of an army solely from its marching camp. A large proportion of the de munitionibus castrorum, therefore, may well be military theory which was not practicable to apply.

Finally, although the regularity and abundance of marching camps are uniquely Roman, it has been shown that the idea of entrenching a camp at night was by no means a Roman one and some form of internal organization was used by the Assyrians. It seems that perhaps Frontinus was correct when he stated that the Romans took the idea of the marching camp from Pyrrhus (Strat.IV i 14).

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[33]Examples of the internal clavicula are found at Mauchamp in Gaul, Masada in Israel, and it is also illustrated on Trajan's Column (scene 127).

Figure i: Details of selected marching camps

SITE	GRID REF	DIMENSIONS (in metres)	AREA (hectares)	RATIO (length: width)	DITCH width depth	GATE TYPE	TOPOGRAPHY
Annan Hill	NY 192655				2.2m 0.7m		On hill above river.
Ardoch I	NN 8410	475 x 260m	11.9 ha	1:1.8	2.7m 1.2m		As above.
Ardoch II	NN 8410	837 x 213m	5.26 ha	1:3.8	2.3m 1.0m	Titulum	Fairly level ground near river.
Ardoch III	NN 8410		48.6 ha		2.7m n/d	Titulum	Knoll in centre of camp.
Arosfa Careg	SN 8026	503 x 308m	15 ha	1:1.6	No ditch	Int claviculae	Boggy at west end.
Balmuildy	NS 586722	262 x 186m	4.9 ha	1:1.4			On knoll near river.
Bernhardsthal	N. of Carnuntum				3.0m 1.8m		On rise above river.
Breteuil	Somme	v.irregular				Titulum	
Bromfield	SO 484775	323 x 258m	8.3 ha	1:1.2	1.5m 0.9m		Middle of flat valley nr confluence of 3 rivers.
Carlops	NT 171572	c.650 x 260m	c.16.9 ha	1:2.5	c.2.8m c.1.0m		Between boggy ground and hills.
Chausée-Tirancourt	Somme				2.75m 0.8m		Adjacent to rampart of Belgic oppidum.

ITE	GRID REF	DIMENSIONS	AREA	RATIO (length: width)	DITCH width depth	GATE TYPE	TOPOGRAPHY
:hew Green I	NT 788084	c.274 x 274m	7.5 ha	1:1	2.5m 1.1m	Int claviculae	On plateau nr small river.
:hew Green III	NT 788084	300 x 190m	5.7 ha	1:1.5	2.2m 1.0m	Titulum	As above & boggy at 1 corner.
hew Green IV	NT 788084	173 x 151m	2.6 ha	1:1.1	3.0m 1.3m	Titulum & Int claviculae	On plateau nr small river.
leghorn	NS 911460	c.500 x 355m	c.17.7 ha	1:1.4	2.9m 0.9m	Titulum	On sloping ground above river crossing.
orbridge	NY 9705				5.0m 2.0m		
Dolau	SO 017666				4.0m 0.6m		On top of knoll by river.
Dullatur I	NS 746767				c.2.1m c.0.9m		
Dullatur II	NS 746767				c.2.1m c.0.9m		
Dunblane I	NN 776006	405 x 326m	13.2 ha	1:1.2	1.9m n/d		On knoll above river.
Dunblane II	NN 776006	275 x 215m	5.8 ha	1:1.27	1.9m n/d		As above.
Dunipace	NS 842821	c.720 x 650m	c.46.8 ha	1:1.1	3.2m 1.5m		On slope towards river.

SITE	GRID REF	DIMENSIONS	AREA	RATIO (length: width)	DITCH width depth	GATE TYPE	TOPOGRAPHY
Dunning	NO 024148	700 x 675m	47.3 ha	1:1	3.0m 0.35m	Titulum	On slight knoll; 2 small burns nearby
Durno-Benachie	NJ 699272	c.930 x 600m	c.58 ha	1:1.5	3.0m 1.3m	Titulum	Sloping ground towards river.
Easter Cadder	NS 644735	122 x 113m	1.4 ha	1:1		Titulum	At end of low ridge
Esgairperfedd	SN 927699	274 x 228m	6.2 ha	1:1.2	1.6m	Int claviculae	Sloping ground above river.
Eskbank I	NT 321668				3.0m 0.9m		Flattish ground near to river.
Eskbank II	NT 321668				2.2m 1.2m		As above.
Finavon	NO 496575		15 ha		c.2.0m 0.3m	Titulum	Flat ground above river.
Folleville	Somme	c.425 x 350m	c.14.8 ha		n/d	Titulum	High ground; valleys on 2 sides, marsh on third.
Garnhall I	NS 785779		4.76 ha		1.75m 0.8m		Level ground in sweep of river.
Girvan	NX 188991		10/16 ha		3.05m 1.25m		Almost flat ground above river.
Gogar Green	NT 176718		c.7.5 ha		1.0m 0.5m		Slightly uneven ground near rivers.

SITE	GRID REF	DIMENSIONS	AREA	RATIO (length: width)	DITCH width depth	GATE TYPE	TOPOGRAPHY
Greenlee Lough	NY 775696				1.9m 0.8m		Level ground near river.
Inverquharity	NO 406580				1.2m 0.9m		Ground sloping down towards river.
Kintore	NJ 787166	785 x 575m	44.5 ha	1:1.4	c.3.25m 1.4m	Titulum	On slope above rivers.
Kirkhouse	NT 097462	c.435 x 360m	15.66 ha	1:1.2	2.8m 0.9m		
Kollnbrunn	N. of Danube	590 x 395m	23.3 ha	1:1.5	3.0m 1.8m		On slope towards river.
Liercourt-Erondelle	Somme	Irregular	15 ha		4.0m 1.8m		
Little Clyde	NS 994159	440 x 290m	12.7 ha	1:1.5	2.1m 0.3m	Titulum	Fairly flat ground, on watershed between 2 streams.
Little Kerse	NS 943788	152 x 143m	2.1 ha	1:1		Titulum	Fairly level; knoll included in annex
Lochlands	NS 854812				1.0m 0.5m		Fairly level, in bend of river.
Malham	SD 913655		8.2 ha		Small		On a plateau.
Mancetter	SP 326967				2.7m 1.2m		

SITE	GRID REF	DIMENSIONS	AREA	RATIO (length: width)	DITCH width depth	GATE TYPE	TOPOGRAPHY
Marcus	NO 5158		25.5 ha		3.15m 1.2m	Titulum	Level ground, near rivers.
Meldon Bridge	NT 205404				1.0m 0.8m		On fairly gentle slope above water
Pennymuir A	NT 755139	518 x 329m	17 ha	1:1.6	3.1m 1.2m		Well drained platform.
Pennymuir C	NT 755139	277 x 195m	5.4 ha	1:1.2	1.0m 0.45m		Falls away sharply in one corner.
Pennymuir D	NT 755139				3.0m 0.3m		On platform.
Pen-y-Gwyrd	SH 660557	219 x 183m	4.0 ha	1:1.2	1.45m 0.55m		In valley beside lake.
Plank am Kamp	N. of Danube	c.130 x 120m	c.1.5 ha	1:1	1.45m 0.6m		On platform in loop of river.
Raedykes		v irregular	37.6 ha		4.75m 2.13m	Titulum	On platform above river.
Rey Cross	NY 901124	274 x 274m	7.5 ha	1:1	traces	Titulum	High ground.
Stracathro	NO 614656	425 x 370m	15.7 ha	1:1.1	2.4m 1.06m	'Stracathro'	Level terrace above river.
Summerston	NS 574723		2.4 ha		1.6m 0.75m		Near river.

SITE	GRID REF	DIMENSIONS	AREA	RATIO (length: width)	DITCH width depth	GATE TYPE	TOPOGRAPHY
Sunny Rigg	NY 695667				no ditch		
Troutbeck I	NY 387273	213 x 195m	4.1 ha	1:1	1.68m 0.9m	Int claviculae	Commanding valley
Troutbeck II	NY 387273	450 x 370m	16.6 ha	1:1.2	n/d	Double claviculae	As above
Troutbeck III	NY 387273	506 x 436m	22 ha	1:1.6		Ext claviculae	As above
Wandel	NS 944265				3.35m 1.05m		Flat ground beside river.
Wooden	NT 742334		16.4 ha+		3.75m c.1.0m		Very gentle slope almost at confluence 2 rivers.
Y Pigwn I	SN 827313	c.426 x 365m	c.15.5 ha	1:1.2		Int claviculae	Highest point of ridge; good views.
Y Pigwn II	SN 827313	c.363 x 283m	c.10.2 ha	1:1.2		Int claviculae	As above.
Ystradfellte	SN 9216	parallelogram	c.8.4 ha		1.7m 0.86m	Int claviculae	On side of valley commanding pass.
Ythan Wells I	NJ 655383	440 x 315m	13.7 ha	1:1.4	1.2m 0.6m	'Stracathro'	On spur of hill above river; below top of hill.
Ythan Wells II	NJ 655383		44.9 ha		3.4m 1.2m	Titulum	As above.

Notes to tables above

Ardoch III:Ditch incompletely cut - flat-bottomed.

Arosfa Careg:Absence of ditch does not seem to be because of the nature of the soil.

Carlops:Ditch slighter on rocky ground towards hills.

Chew Green IV:May be a semi-permanent labour camp which would explain the strong defences.

Corbridge:May be a labour camp rather than a temporary camp.

Dolau:May be a semi-permanent camp.

Dullatur II:Later camp, reuses fortifications of earlier.

Durno-Benachie:Ditch does not surround camp completely because of rocky outcrop.

Esgairperfedd:Site seems to have been laid out specifically to incorporate a small rise in one corner for enhanced vision. Location may be to get maximum protection from the prevailing winds.

Kollnbrunn:Dated to Marcommanic wars.

Little Clyde:Ditch probably rock-cut in places.

Malham:Ditch apparently lacking round parts of circuit, where bedrock is near the surface.

Mancetter:Identification uncertain; may be a camp or a fort.

Plank am Kamp:Dated to Marcommanic wars.

Raedykes:Irregular outline to suit the terrain.

Rey Cross:Rock close to surface probably explains the absence of ditch.

Summerston:May be an Antonine Wall construction camp.

Sunny Rigg:This has been described as a camp of the Vegetian type with no ditch (III 8) though it is sited between Hadrian's Wall and the Vallum, and is more likely to be a construction camp than a marching one.

Y Pigwn II:This camp is inside Y Pigwn I but there was no reuse of fortifications.

Ystradfellte:Pollen sampling suggests there may have been some tree clearance in the area during camp construction.

Bibliographical references for marching camps included in table above.

Annan Hill	JRS 51 (1961) 122; Brit 17 (1986) 374.
Ardoch	Brit 1 (1970) 163-78.
Arosfa Gareg	JRS 50 (1960) 213; JRS 55 (1965) 199; Nash-Williams/Jarrett (1969) 124.
Balmuildy	Brit 3 (1972) 303; Brit 5 (1974) 405; Brit 6 (1975) 227; RCAHMS Lanarks.
Bernhardsthal	Kandler/Vetters (1986) 244-247.
Bretueil	Agache (1970) fig 392; Wightman (1985) 35, 38.
Bromfield	JRS 46 (1956) 130.
Carlops	Brit 17 (1986) 371; Brit 18 (1987) 32.
Chausée -Tirancourt	Agache (1970 38).
Chew Green	Richmond 1940.
Cleghorn	Brit 3 (1972) 304.
Corbridge	Brit 6 (1975) 330.
Dolau	JRS 56 (1966) 196.
Dullatur	Brit 7 (1976) 301; Brit 8 (1977) 364; Brit 16 (1985) 264.
Dunblane	Antiquity 25 (1951) 95; JRS 57 (1967) 175; JRS 58 (1968) 178.
Dun Ipace	Brit 15 (1984) 275; Brit 18 (1987) 37; Brit 20 (1989) 271; Brit 21 (1990) 312; Brit 22 (1991) 230.
Dunning	Brit 20 (1989) 269-70.
Durno	JRS 67 (1977) 141; Brit 9 (1978) 271-287.
Easter Cadder	RCAHMS Lanarks 1978.
Esgairperfedd	JRS 57 (1967) 174.
Eskbank	Brit 4 (1973) 275.
Finavon	JRS 63 (1973) 224; JRS 67 (1977) 140; Brit 19 (1988) 425.
Folleville	Agache (1970) fig.387-388; Whightman (1985) 38, 49.
Garnhall	Brit 9 (1978) 415; Brit 21 (1990) 312.
Girvan	Brit 9 (1978) 397-400; Brit 13 (1982) 339; Brit 18 (1987) 34.
Gogar Green	Brit 16 (1985) 265; Brit 18 (1987)38.
Greenlee Lough	Brit 15 (1984) 278.
Inverquharity	Brit 15 (1984) 274; Brit 16 (1985) 263; Brit 18 (1987) 15, 29.
Kintore	JRS 67 (1977) 140; Brit 19 (1988) 425.
Kirkhouse	Brit 15 (1984) 276; Brit 17 (1986) 371-4; Brit 18 (1987) 33.
Kollnbrunn	Kandler/Vetters (1986) 241-2.
Liercourt -Erondelle	Agache (1970) fig 376-7; Whightman (1985) 38, 40.
Little Clyde	Brit 15 (1984) 275.
Lochlands	Brit 15 (1984) 275; Brit 18 (1987) 29, 39.; Brit 20 (1989) 271.
Malham	JRS 58 (1968) 180.
Mancetter	Brit passim.
Marcus	Brit 19 (1988) 425-6.
Meldon Bridge	Brit 7 (1976) 306; Brit 9 (1978) 418.
Pennymuir	PSAN[4] vii 107ff.
Pen-y-Gwyrd	JRS 45 (1955) 121; JRS 54 (1964) 152.
Plank am Kamp	Kandler/Vetters (1986) 236.
Rey Cross	TCWAAS[2] 34 (1934) 50-61; Collingwood & Richmond (1969) 13; Frere & St Joseph (1983) 23-5.
Stracathro	Brit 1 (1970) 163-178.
Sunny Rigg	Brit 13 (1982) 343.
Summerston	Brit 12 (1981) 320; Brit 14 (1983) 288; Brit 18 (1987) 28.

Troutbeck	TCWAAS 1956 28-36; JRS 45 (1955) 83-4; JRS 63 (1973) 215; Brit 5 (1974) 412-3.
Wandel	JRS 51 (1961) ; RCAHMS Lanarks; Brit 18 (1987) 34.
Wooden	Brit 14 (1983) 289; Brit 18 (1987) 32.
Ystradfellte	JRS 50 (1960) 213; JRS 55 (1965) 199; RCAHM Brecknock 153
Ythan Wells	JRS 63 (1973) 216-233; JRS 67 (1977) 131-45; Brit 1 (1970) 163-178.

Figure ii: Application of the de munitionibus castrorum to Rey Cross and Durno

Rey Cross
Dimensions: 900 x 900ft[34] = 18.6 acres (7.53 ha).
Intervallum: 35 ft

Plot 1: 150 x 150 ft, 6 hemistrigae.
1 legionary cohort (DMC § 2)

Plot 2: 200 x 150 ft, 6 hemistrigae per strigas.
1 legionary cohort (DMC § 2)

Plot 3: 200 x 120 ft, 6 hemistrigae per strigas.
1 legionary cohort (DMC § 2)

Plot 4: 250 x 120 ft, 8 hemistrigae per strigas.
1 legionary cohort (DMC § 1) + 200 scouts (DMC § 30)

Plot 5: 150 x 150 ft, 6 hemistrigae.
1 legionary cohort (DMC § 2)

Plot 6 & 7: 200 x 200 ft + 200 x 200 ft, 12 hemistrigae 200 ft long per scamnum.
Each hemistriga could take 66 cavalrymen (200 ÷ 3 ft per cavalryman DMC § 16), or 2 turmae of 30 – 32 men.
Total of 24 turmae, or a milliary ala.
20 ft remain which is assigned to the tribunes (DMC § 36 which suggests 60 ft).

Plot 8: 220 x 220 ft, 14 hemistrigae per strigas, each 10 ft shorter than recommended (DMC § 1).
1 legionary cohort (DMC § 2), the remaining 8 hemistrigae could provide space for one quingenary cohort camped fairly spaciously (DMC § 40).

Plot 9: 150 x 250 ft, 10 hemistrigae per strigas.
1 legionary cohort (DMC § 2), leaving 4 hemistrigae, see entry for plot 10.

Plot 10: Praetorium. 400 x 250 ft.
Praetorium 150 ft wide (DMC § 9), leaving 8 hemistrigae (4 x 2) on each side.
Latera sinistra: 6 hemistrigae, together with the 4 remaining hemistrigae from plot 9 – Quingenary part mounted cohort (DMC § 25-27).
2 remaining hemistrigae could take up to 80 equites singulares (DMC § 7).
Latera dextra: 6 hemistrigae for quingenary infantry cohort (DMC § 28); 2 for infirmary (DMC § 4).

Plot 11: 200 x 250 ft, 12 hemistrigae per strigas.
Milliary legionary first cohort (DMC § 3) occupying 10 hemistrigae; fabrica the remaining 2 (DMC § 4).

Plot 12: 150 x 200 ft, 6 hemistrigae per scamnum.
Legionary cohort.

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[34] Camp dimensions are given in Imperial measurements to facilitate application of the rules of the DMC where all measurements are given in Roman feet (0.97 of an English foot).

Plot 13 & 14: Quaestorium. 350 x 200 ft.
Quaestorium 90 ft wide (DMC § 18), leaving 8 hemistrigae 200 ft long per strigas.
This is room for 1328 auxiliary infantry (DMC § 25). If the Quaestorium was slightly narrower, or the auxiliaries were squashed in a bit, there would be space for 1360 auxiliary infantry, or the infantry and cavalry of a milliary part mounted cohort (DMC § 26).

Plot 15: 150 x 150 ft, 6 hemistrigae.
1 legionary cohort.

Total forces[35]:	Infantry	Cavalry	
1 legion with ∞ 1st coh	5120		
1 ala. ∞		720	
1 coh eq. ∞	800	240	
1 coh eq.	480	120	
2 coh quing.	960		
scouts	200		
Total:	7560	1080	= 8640

Density of troops per acre = c.460.

Durno
Dimensions: c.930 x 650m = c.56 ha (143 acres).
Intervallum: 60 ft.

Plot 1 (praetentura left side): 840 x 900ft.
6 legionary cohorts arranged around the perimeter (DMC § 2).
Remaining space of 720 x 720 ft[36] occupied by:
scamnum of legates & tribunes (140ft wide including road)
4 quingenary infantry cohorts (120 ft wide)
1 quingenary ala (90 ft wide)
1 milliary ala (150 ft wide)
Road (20 ft wide)
180 ft width remaining contains:
1 legionary 1st cohort
2 quingenary infantry cohorts
1 quingenary cohors equitata
200 scouts.

Plot 2 (praetentura right side): 900 x 900ft.
6 legionary cohorts arranged around the perimeter (DMC § 2).
Remaining space of 780 x 720 ft (24 hemistrigae) occupied by:
scamnum of legates & tribunes (140 ft wide including road)
3 quingenary infantry cohorts (90 ft wide)
3 quingenary alae (270 ft wide)

---

[35]Calculations are done on the basis of the theoretical strength of units accepted in chapter 3: Legion 5120; Ala ∞ 720; quingenary ala 512; milliary cohort 800; quingenary cohort 480; milliary cohors equitata 800 infantry + 240 cavalry; quingenary cohors equitata 480 infantry + 120 cavalry.

[36]This allows space for 24 hemistrigae, each 30ft wide (DMC 34-6).

Road (20 ft wide)
180 ft width remaining contains:
1 legionary 1st cohort
1 quingenary infantry cohort
1 quingenary cohors equitata
600 marines
hospital, vet, fabrica.

Praetorium 220 ft wide (DMC § 9)

Plot 3 (left side of praetorium): 600 x 1000 ft.
4 legionary cohorts along the perimeter (DMC § 2).
Remaining space of 480 ft x 1000 ft occupied by:
Praetorium (80 ft wide)
Guard post (20 ft, DMC § 9)
Comites (60 ft, DMC § 10)
Road (25 ft)
300 Equites Singulares (30 ft)
1 quingenary ala (60 ft)
Road (25 ft)
180 ft width remaining contains:
1 legionary 1st cohort
4 quingenary cohortes equitatae.

Plot 4 (right side of praetorium): 1200 x 1000 ft.
4 legionary cohorts along the perimeter (DMC § 2).
Remaining space of 1080 x 1000 ft occupied by:
Praetorium (80 ft wide)
Guard post (20 ft, DMC § 9)
Comites (60 ft, DMC § 10)
Road (20 ft)
300 Equites Singulares (30 ft)
Pedites Singulares (30 ft)
2 quingenary infantry cohorts + 1 milliary infantry cohort (60 ft)
1 quingenary ala (90 ft)
Road (20 ft)
3 quingenary alae + 3 quingenary infantry cohorts (270 ft)
Road (20 ft)
2 quingenary alae + 2 quingenary infantry cohorts (180 ft)
Road (20 ft)
180 ft width remaining contains:
1 legionary 1st cohort
4 quingenary cohortes equitatae.

Plot 5 (left side of retentura): 600 x 800 ft.
5 legionary cohorts arranged around the perimeter (DMC § 2).
Quaestorium (80 ft wide)
Remaining 400 ft occupied by:
2 roads (40 ft)
1 milliary cohors equitata
3 quingenary cohortes equitatae
1 milliary infantry cohort
1 quingenary infantry cohort.

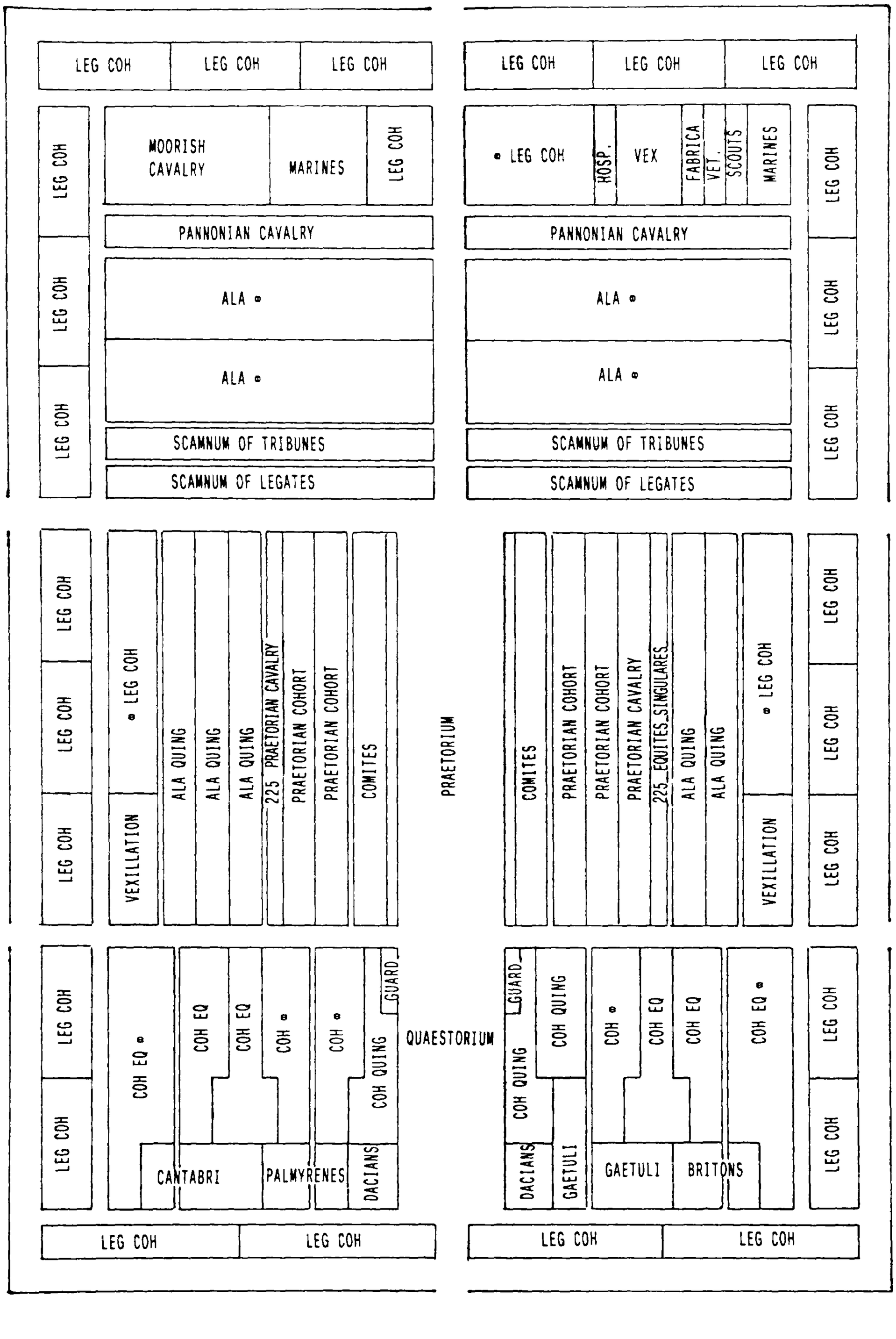
Plot 6 (right side of retentura): 900 x 800 ft.
6 cohorts arranged around the perimeter (DMC § 2).

Quaestorium (80 ft wide)
Remaining 700 ft occupied by:
3 roads (60 ft)
4 quingenary cohortes equitatae
3 milliary infantry cohorts
6 quingenary infantry cohorts

Total forces:	Infantry	Cavalry	
2 legions with ∞ 1st coh	10240		
15 cohort vexillation with 2 ∞ 1st cohorts	7840		
1 ala ∞		720	
11 quingenary alae		5632	
1 cohors equitata ∞	800	240	
17 quingenary cohortes equitatae	8160	2040	
5 milliary infantry cohorts	4000		
25 quing. infantry cohorts	12000		
marines	600		
scouts	200		
guards	160		
equites singulares		600	
pedites singulares	300		
Total	44300	9232	=53532

Density of troops per acre = c.370.

Figure iii: Reconstruction of the de munitionibus castrorum camp



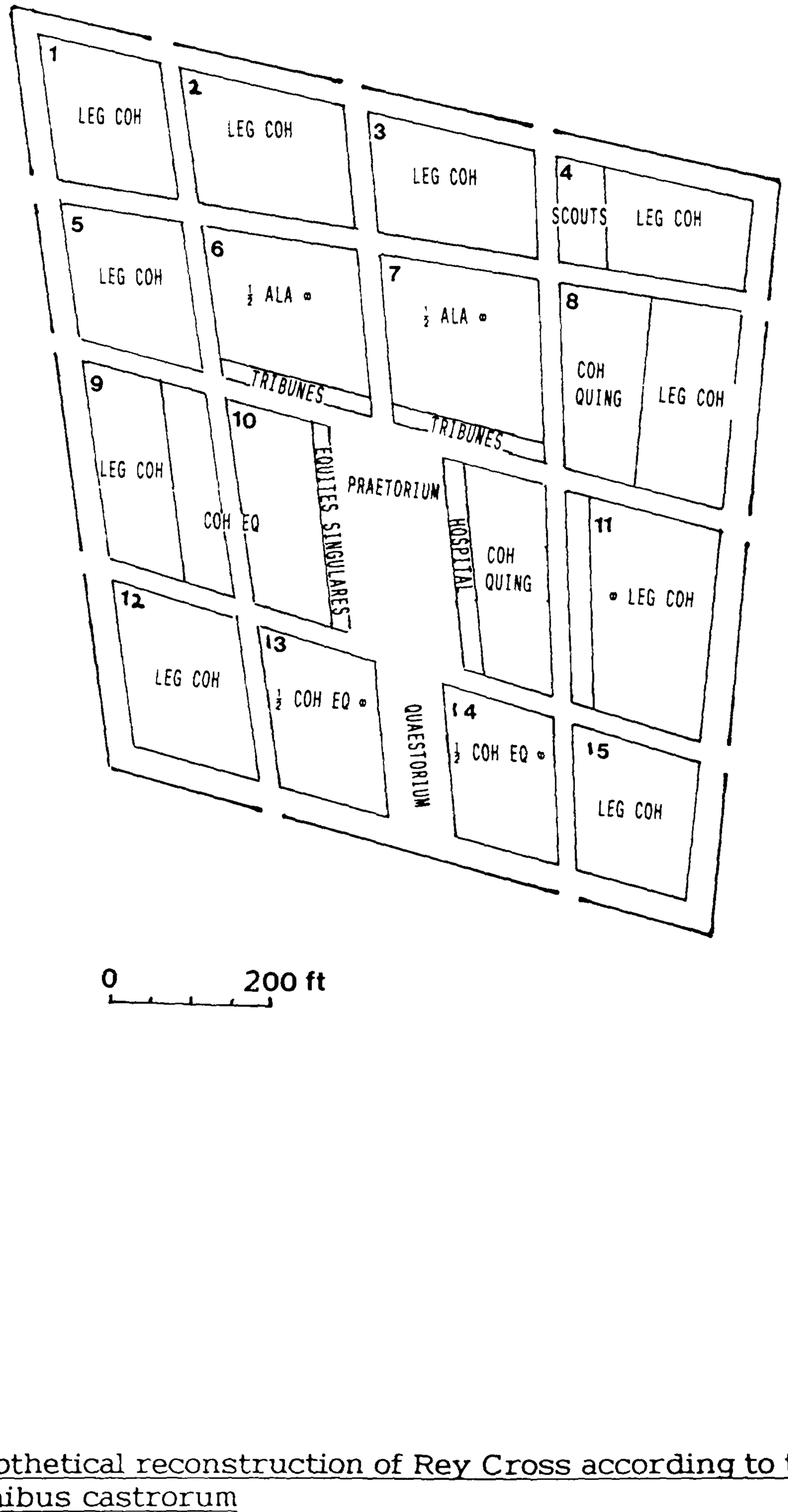
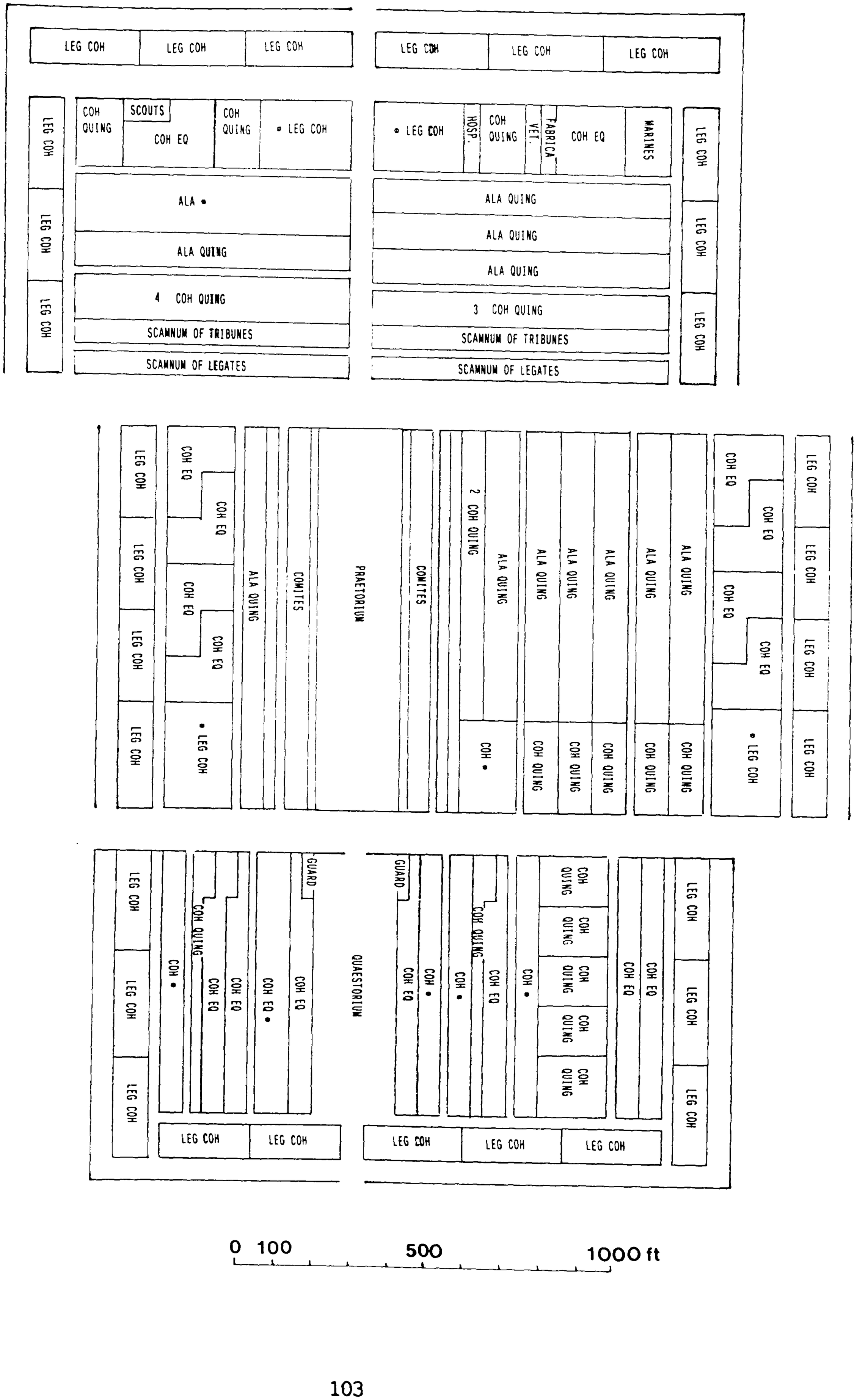


Figure iv: Hypothetical reconstruction of Rey Cross according to the rules of the de munitionibus castrorum

Figure v: Hypothetical reconstruction of Durno according to the rules of the de munitionibus castrorum


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LEG COH
LEG COH
LEG COH
LEG COH
LEG COH
COH QUING
SCOUTS
COH EQ
COH QUING
LEG COH
HOSP.
COH QUING
VET.
FABRICA
COH EQ
MARINES
ALA •
ALA QUING
ALA QUING
ALA QUING
ALA QUING
4 COH QUING
3 COH QUING
SCAMNUM OF TRIBUNES
SCAMNUM OF TRIBUNES
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SCAMNUM OF LEGATES
LEG COH
LEG COH
LEG COH
LEG COH
COH EQ
COH EQ
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Chapter 5: The Order of March

Introduction

An army in marching formation was in a potentially very vulnerable situation and the dangers are outlined in the treatises and reflected in the advice they provide. Polybius includes a fairly detailed description of the Roman line of march during the mid Republic. Onasander's advice, as usual, is much more general than that of Vegetius and less detailed too, but between them they do provide information on the organization of the marching column during the Empire.

Descriptions of an army's line of march rarely provide the historian with the opportunity to exercise his dramatic abilities, though there can be a certain impressiveness about a detailed description of an army on the march. Josephus' descriptions of the armies of Vespasian and Titus (BJ III 115ff, V 39ff) are quite striking, as is Tacitus' account of the march into Rome by Vitellius' troops in AD 69 (Hist.II 89). To Lucian (On the writing of History 29 & 37) such descriptions are a minor but integral part of historical narrative, and he stresses the importance of accuracy. Sallust, Caesar, Josephus, Tacitus and Arrian all provide details of Roman marching formations and so comparison between these and the advice of the treatises is possible.

This chapter will compare the advice given in the treatises with descriptions of marching columns in the historical sources and consider the types of marching formations used in different circumstances, the length and width of marching columns and their vulnerability to attack. Finally, I will consider the relationship between line of march and line of battle, and the deployment of an army from one to the other with particular reference to Arrian's ektaxis.

Sources

Onasander and Vegetius point out the vulnerability of an army in marching order, and the latter suggests there are more dangers on the line of march than in the battle itself (III 5), because of the possibility of ambushes which could easily throw the line into disorder. Soldiers should be familiar with marching in formation on the alert (Onas.vi), and this is no doubt one reason that the Constitutiones of Augustus and Hadrian required both infantry and cavalry to carry out route-marches regularly. Tacitus notes a prohibition on falling out on the line of march and this may have been a military regulation (Annals XI 18)[1].

Polybius and Vegetius provide details about the position of the different troops on the line of march (Polybius VI 40-41; Veg.III 5), but Onasander is much less specific. As usual, he provides more general advice to guide the commander in making his own decisions, whereas Vegetius' recommendations are much firmer and allow little latitude for alterations. Onasander states that the marching line must be as compact as possible, more of a rectangular formation, not very much longer than its width (vi-vii). Such an arrangement, he suggests, is much safer and easier to manage in an emergency; a long thin column may panic. A flank attack would easily pierce it, and if such a column wheeled into battle line to face the enemy, it would lack depth and therefore be too weak to resist. None of the treatise writers suggests how wide the marching column should be, but Onasander's comment on the line wheeling into battle line suggests that it would have to be fairly wide to provide a battle line of sufficient depth, and that there had to be some relationship between the order of march and line of battle.

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[1] veterem ad morem reduxit, ne quis agmine decederet nec pugnam nisi iussus iniret.

Although Vegetius stresses the vulnerability of the line of march, he does not provide any detailed advice on minimizing the threat of an attack, other than obtaining detailed intelligence and sending scouts in advance (III 5). Onasander and Vegetius, however, both emphasise that the soldiers must be prepared for marching and fighting simultaneously (III 5) and Onasander additionally advises that if the line of march passes through confined or difficult country, part of the force should be sent ahead to occupy passes and high ground to prevent ambushes.

Polybius' description (VI 40-1) and the recommendations of Onasander (vi-vii) and Vegetius (III 5) for dispositions on the line of march are as follows:

Polybius	Onasander	Vegetius
↑	↑	↑
Right wing of Socii - Cavalry Infantry (Their baggage) Legion I (Their baggage) Legion II (Their baggage) (Baggage of following:) Left wing of Socii - Infantry Cavalry	Cavalry to scout in advance. Compact rectangular formation. Baggage & medical equipment in centre of column.	Scouts Cavalry Legions Baggage train, flanked by infantry Light infantry Light cavalry
Picked troops from Socii at front or rear depending on area of greatest threat.	Bravest soldiers at front or rear depending on area of greatest threat.	Picked cavalry & light infantry on flank under greatest threat.
In times of extreme danger (if sufficient space, the infantry marches in parallel columns of <u>hastati</u>, <u>principes</u> and <u>triarii</u>.		

The formation of the marching column differs very little from the time of Polybius to the date of Vegetius' source. Scouts were sent ahead of the marching column, cavalry situated at both van and rear, as were light

infantry, the socii or auxiliaries. The baggage train, or trains, were placed in the centre of the line or in a well protected position, and could be supplied with a flank guard. The legions marched in the centre of the column. Picked cavalry and infantry formed extra protection for the part of the column facing the greatest potential danger, whether it was the van, rear or flanks. In times of extreme danger, Polybius' army could march in parallel columns able to manoeuvre directly into battle line. This was no doubt Onasander's intention also, and Vegetius' recommended line could wheel directly into a standard battle line with legions in the centre and auxiliaries and cavalry on the wings (cf: battle dispositions in Chapter 6 on Pitched Battles).

Varro also mentions two types of marching formation (ap.Servius Aen.XII 121), the quadratum with the baggage animals within the marching formation and the pilatum (close-packed) which advances in a very compact formation without baggage for use in dangerous or unfavourable ground. The term agmen pilatum is recorded in a historical context only once[2]. Varro does not appear to mention the basic type of formation, for use in secure territory (see above p.106). The evidence of the treatises does suggest that there were a number of variants to the basic line of march for use under different tactical and topographical circumstances.

Although none of these authors mentions the role of engineers and surveyors in advance of the main column to clear obstacles from the route, the de munitionibus castrorum provides some information on this matter, and their

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[2]Servius is again the source for this reference, from the autobiography of M.Aemilius Scaurus, in agrum hostium veni pilatum exercitum duxi (ap.Servius Aen.XII 121). The context indicates that the agmen pilatum was used under the same conditions as the agmen quadratum.

importance is well illustrated by Josephus (BJ III 141)[3]. The army of the de munitionibus castrorum included 1300 marines from the fleets at Misenum and Ravenna (§ 30). These all camped in the praetentura because they lead the army out of the camp and constructed roads (§ 24), presumably also clearing obstacles etc[4].

Field Practices

Historians often neglect to mention the presence of scouts at the front of the column. Arrian mentions them (ektaxis 1), but there seems little doubt that the terrain through which the army was to march would always be carefully scouted in advance. Analysis of the descriptions provided by the historians shows little variation in the 'standard' line of march between the campaigns of Metellus in 109 BC (Jug.46) and Arrian's proposed campaign against the Alans in AD 135. Fig. vi below illustrated descriptions of marching formations from Sallust to Arrian.

It was usually the case that the legions marched in the centre of the column with the allies or auxiliaries at the front and rear. Cavalry again were normally positioned as the van and rearguards[5]. The general and his retinue, including bodyguard and Praetorian cohorts if the emperor or a member of the imperial family was on campaign, were positioned in the centre of the line,

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[3]The difficult mountain route from Gabora to Jotapata was transformed into a broad highway suitable for heavy infantry and the Roman siege train in four days.

[4]The army included 200 scouts also encamped in the praetentura (§ 24), because they would lead the army out of the camp. The construction of roads in unconquered territory seems a bit unrealistic and perhaps the clearing of obstacles was their primary function.

[5]This has important implications concerning the correlation between the line of march and line of battle which will be considered below.

before or between the legions[6]. The baggage train and siege equipment were also usually placed in the centre of the column (eg: Annals XIII 40), or it could be split up. Thus in Josephus' two descriptions, the officers' baggage, siege equipment and main baggage train are in separate parts of the column, as are the siege and baggage trains of Arrian's line. Caesar often placed his baggage train towards the rear of his marching line, followed by his less experienced legions (eg: BG II 19; VIII 8). Reference is occasionally made to flank guards, usually consisting of cavalry (Arrian), though the cavalry could be interspersed with skirmishers (Jug.46), as recommended by Vegetius (III 5, though here they are only on the flank under greatest threat). The use of flank guards in this fashion may be linked with the proximity of the enemy (to be considered below)[7], or with an intention to deploy from normal marching formation to line of battle when there would normally be sufficient time to manoeuvre under the cover of cavalry (see below p.115ff).

Polybius' account suggests that there were two different march formations, the second being employed in times of extreme danger, when there was the probability of an attack. It is under these circumstances that one would expect to see a close correlation between line of battle and line of march and indeed, Polybius' second formation is essentially the battle line; a simple left or right turn would convert the marching column immediately into battle line.

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[6]General and retinue placed before legionary force, BJ III 115ff; V 39ff; Arrian ektaxis 4; between the legions, Annals II 16.

[7]It is interesting to note that the position of the various units in marching camps, as recommended by the de munitionibus castrorum, is quite similar to their position on the line of march; cavalry and light infantry are stationed at both ends of the camp and the general, his bodyguard and the baggage are again in the centre, the best protected area. Such an arrangement in camp would no doubt facilitate forming up the line of march when the army set out again.

Several of the historians also appear to indicate that there were two different types of marching formation. Sallust mentions that Metellus' column in Africa was advancing "just as if an enemy were close at hand" (Jug.46), and again, Marius marched in a square formation (agmen quadratum) "exactly as if he were in sight of the enemy" (Jug.100). Finally, Seneca refers to a simile used by a philosopher Sextius about an army marching in agmen quadratum "ready for battle, in a place where the enemy might be expected to appear from any quarter" (Ep.59.7.3). Other authors mention that a particular marching formation was almost a line of battle (Hirtius, BG VIII 8), or that the line of march could wheel directly into line of battle (Tac.Annals I 51; II 16). At one point, Caesar's legions were marching in triplex acies formation (BG IV 14), most likely the arrangement for times of extreme danger described by Polybius and adapted for use by a legion with cohorts. Livy is the only historian to use the term agmen quadratum regularly, and on virtually every occasion the army using the formation was either approaching the enemy or marching under dangerous circumstances[8]. The historian gives some indication of how tightly packed the agmen quadratum could be when he states that the soldiers at a military show formed up in this fashion preparatory to forming the testudo (39.30).

The literature therefore seems to substantiate Polybius' statement that two types of marching column did exist, one for advancing through friendly territory or when there was no likelihood of an enemy attack, the other for use when the probability of attack was high, or the army was marching into battle.

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[8]Livy uses the term 12 times; 2.6; 7.29; 10.14; 21.5; 21.32; 21.57; 31.37; 35.3; 36.10; 39.30; 44.9; Fr 21.97.

Various historians have attempted to analyze the different types of marching formation, categorize them and provide explanations for their use under different circumstances. Kromayer and Veith saw three types of marching column in the late Republic (1928 420ff), the route march (Reisemarsch), the first system described by Polybius, the Caesarian battle march (iter expeditum) in which the main legionary force or 'gros' marched without baggage, followed by the baggage train and with one quarter of the legionary force as the rearguard, and the agmen quadratum. Marquardt (1891 131-4) also saw three distinct types, again mentioning the particular formation employed by Caesar. Le Bohec, however, sees only two different types of marching column during the Empire and suggests that the use of these was dependent upon topographical circumstances (1989a 136-7 & fig 18). He suggests the narrow column without flank guards used by Caesar (BG II 19) and Titus (BJ V 39ff) was for use in confined terrain whereas the column with flank guards, either of infantry or cavalry, was for level, open terrain (eg: Germanicus, Annals II 16; Arrian).

Apart from the aspects of the 'standard' line of march outlined above (p.108), which most marching columns seem to have included, it is possible to see variations between the formations used by different generals and in different campaigns. The evidence from the Bellum Gallicum suggests at least three different orders of march used by Caesar, the iter expeditum mentioned by Kromayer and Veith and Marquardt, his "usual type of marching formation" which Belgic scouts described to the Nervii (BG II 17) and which from Caesar's own comments suggests was his normal march when not expecting an attack. Finally there is the triplex acies marching formation (BG IV 14) and the agmen quadratum (Hirtius, BG VIII 8). Caesar himself does not use the term agmen quadratum but the context in which the two terms are used are so

similar that they probably refer to the same formation, for use when the army was expecting to engage immediately in a pitched battle.

Within the two types of marching formation defined by Polybius, the first for use in secure territory, the second for insecure, there appear to be a number of variants, particularly with the second type. This would appear to include the agmen quadratum or triplex acies, Caesar's iter expeditum, the type described by Tacitus which could wheel directly into battle line, and Arrian's column with its flank guards. The major difference between this formation and the first type described by Polybius and used by Caesar (BG II 17), Vespasian (BJ III 115ff) and Titus (BJ V 39ff), is that the former was more compact, sometimes with flank guards (Jug.46; Arrian) and could deploy directly into line of battle.

Le Bohec's suggestion that the different marching formations were for use in different types of terrain seems unlikely. He presumably argues this simply on the grounds that a confined space would require the marching column to be much narrower. Obviously there had to be some relation between the width of the line of march and the kind of terrain the army was marching through, and the Anonymous Byzantine treatise on Strategy describes how the width of the column should be decreased and increased as confined areas are negotiated (Strat.18), but the column returned to its normal width afterwards. It seems more likely that the major difference between the two types of marching formation is, as Polybius states, tactical.

The repetition by the historians that the second type of marching formation could be wheeled or formed up directly into line of battle suggests Polybius' description and the reasons for the differences are accurate. Analysis of the

circumstances of these lines of march prohibits the dismissal of these statements as simply a literary topos. In most cases when the second formation was used and the historian comments on the column's ability to wheel directly into line of battle, the army does indeed form up a battle line and engage the enemy, or the commander expected an attack on the column or an engagement (Jug.46; 100; BG IV 14; VIII 8; Annals I 51; I 64; II 16; XIII 40; Arrian).

Although, as stated above, there are variations in the formations of different generals and campaigns, particularly in the Caesarian campaigns in Gaul with apparently three different marching formations in use, in the case of the actual order of march there does appear to be a fairly close agreement between the information supplied by the treatises and the field practices.

Attacks on the line of march

The number of attacks carried out on marching columns illustrates the vulnerability of the formation[9]. It was not only the Romans who realized this weakness; her enemies were also aware of it, and during Caesar's Gallic campaigns, the Gauls frequently attacked him on the march[10]. As mentioned above, Caesar records how the Nervii planned to attack the Roman army on the march after receiving intelligence from Belgic spies about the Romans' usual marching formation (BG II 17) but their attack failed because the Roman forces were approaching the enemy and, as stated above, Caesar employed a different marching order under such circumstances.

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[9]BG III 20; III 24; VII 67; BC I 64; I 78-9; B.Afr.6; 67-9; 75; B.Hisp.10; Annals II 5; BJ II 540.

[10]One of the other times of danger for a Roman army was when entrenching, another favourite time for the Gauls to attack (BG II 19; III 28), illustrating that they were perfectly aware of the best time to attack a Roman army (see above, chapter 4 on Marching Camps).

Such attacks were usually made primarily with cavalry or with cavalry and light infantry together, and cavalry were usually used initially to defend the column[11]. The deployment of cavalry on the flanks of the column as well as at the front and rear was therefore important to provide some protection for the marching infantry from surprise cavalry attacks. As with deployment into battle line, the cavalry could provide a protective screen for the infantry to prepare for an attack by the enemy infantry should the cavalry screen be driven off (eg: BG III 20ff). However, the cavalry could become an additional burden if they were defeated. Under such circumstances, the cavalry might be taken within the lines of the marching column for protection in the same way that the baggage was (BC I 79).

The Bellum Africum includes several descriptions of attacks on lines of march and these illustrate the effects of the concerted harrying of the line. Labienus attacked Caesar's march (B.Afr.69-70), primarily from the rear, with the intention of forcing Caesar's army to make camp where there was no water. Caesar was forced to halt his march and drive off the initial attack before continuing, and with repeated attacks by Labienus, he had to march slowly with the legions at the rear. The column alternately marched, then halted to make a stand. Caesar made his intended camp, but it took him a lot longer than he had planned. The next time Labienus attacked, Caesar was prepared with 300 men from each legion in light marching order, who would not be fatigued from carrying heavy kits (B.Afr. 75). Together with the cavalry, these legionaries drove off Labienus' men. Caesar was certainly aware of the

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[11]Attacks with cavalry: BG III 20; VII 67; BC I 64; I 78; B.Afr.6; with cavalry and light infantry: B.Afr.67, 75; cavalry defending the marching column: BG III 20; VII 67; B.Afr.6; 67; cavalry together with light infantry, against a similar attack: B.Afr.78.

importance of keeping his men on the alert as Onasander and Vegetius recommended (see above p.106).

Dio's description of the Varian disaster and his accompanying comments clearly illustrate the dangers of not keeping in proper formation; Varus' army initially kept to no regular order and because the baggage and camp followers were mixed in with the units, the soldiers were unable to form up in sufficient numbers to resist the enemy attacks (Dio LVI 20-1). The following day the march order was better organized but because of the confined space through which the army was passing, it was very difficult for the cavalry and infantry to form up properly. The Romans suffered severe casualties on both days and were unable to retreat to safety.

<u>Length and width of marching columns</u>

Both the treatise writers and the historians suggest that a long narrow line of march was in particular danger in hostile terrain, and the advice in the treatises in general is for the use of a rectangular formation (eg: Onasander, see above p.106). Since the treatises do not advise any particular width for a marching column, this may not have been of particular importance as long as the column was wide enough to prevent it being pierced by a flank attack. Unless the enemy was close at hand, in which case the army would probably be marching in the <u>agmen quadratum</u> or <u>triplex acies</u> formation, there would usually be sufficient time to manoeuvre into line of battle under the cover of the cavalry, as Arrian intended his army to do (<u>ektaxis</u> 11). Although there is a clear correlation between the width of Arrian's marching column and the depth of his intended battle line, this is not necessarily the case with Vespasian's line, the only other example for which the actual column width is given. I shall return to this matter shortly.

Onasander advises against an extended column for several reasons, including the concern that such a formation was more likely to induce panic and apprehension due to uncertainty (vi 5), and he gives an example of this:

> "For sometimes the leaders, after descending from mountains into treeless and level regions, observing those in the rear still descending, have thought the enemy were attacking, so that they have been on the point of marching against their own men as enemies, and some have even come to blows."

Such a misidentification could actually happen, as with Vitellius' army in AD 68 (Hist.II 68). The dangers of a long line of march with a heavy baggage train are well illustrated in the historical literature; Caesar mentions that Cotta's retreating column was too long for it to be properly controlled (BG V 31), and Tacitus remarks that a column with a long baggage train was easy to ambush and difficult to defend (Annals II 5).

Although analysis of actual lines of march and their length is difficult because of the few detailed accounts in the histories, Gichon has attempted to do this with Vespasian's advance into Judaea (1986 303-8), and he suggests the Roman army would have formed a marching column 28-30 km long. If this were the case, the army would have been extremely vulnerable to attack, especially in the absence of flank guards and with the possibility of attacks by the Jews in the mountainous territory. Gichon admits that with a column this long, "the head of the troops entered camp for their overnight rest before the last of the troops were able to leave the site of the previous overnight stay" (1986 307). This seems extremely long for an army with a core of only three legions despite the large number of auxiliary units and the siege train.

Gichon has used Josephus' catalogue of the Roman forces as the basis for his calculations (BJ III 65-69) and, like Josephus, gives the full theoretical

figures for every unit involved[12]. Thus, in his calculations the legions are all 6000 strong, milliary auxiliary units 1000 and quingenary 500, and cohortes equitatae at 500 infantry plus 120 cavalry. As I have argued elsewhere, these are highly unlikely to be the theoretical strengths of the units anyway (see Chapter 3, on The Organization of Units), and although the units may have been brought up to strength for the war, Vespasian's army is unlikely to have been quite so numerous. Gichon also has the advance guard marching in formation three cavalry or four infantry abreast, so the van is 7.2 km long, but many of the units in the van would probably have fanned out in advance of the main column carrying out scouting duties.

There is no doubt that Vespasian's line of march would have been of considerable length, particularly with the siege equipment, but 28 km does seem excessive. The importance of a shorter column is illustrated when Caesar's legions were attacked when entrenching by the Nervii (BG II 19), and the two legions at the rear of the column behind the baggage train were on the scene fairly quickly (BG II 26). When his column was attacked on the march to Alesia, Caesar seems to have been able to take charge of the situation fairly easily, moving troops to protect the line where it was threatened (BG VII 67). Had the column been more than a few miles long, this would not have been very easy to accomplish. An army marching in agmen quadratum or triplex acies formation would be more compact because of the parallel columns, although the use of these formations might be affected by the general topography, particularly in mountainous regions. An alternative, which would be useful in the latter circumstances, was to advance in separate columns as Agricola did in Scotland (Agric.25), and as possibly illustrated on Trajan's

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[12]Gichon's calculations, like those of Josephus, are based on the theory that each century contained 100 men.

Column (scenes 63-4; 106-9)[13]. Since the campaigning season was limited to the best weather of the year it seems probable that the ground would have been sufficiently hard for this to be achieved.

The only other description of a line of march which survives in sufficient detail for similar analysis is Arrian's ektaxis. Arrian provides a unique picture of a Roman marching column but even here there are problems in calculating its exact length. Although many of the units mentioned by Arrian can be firmly identified, with others it is not entirely certain whether the units were quingenary or milliary. In addition, some of the units were present only as vexillations[14]. Since part of the Cappadocian army was in Judaea it is impossible to tell whether other units were at full strength or present only as vexillations. Finally, although Arrian mentions that the legions marched four abreast (ektaxis 5 & 6), he does not provide any details on the width in numbers of the auxiliary infantry and cavalry[15]. The figures for the size of Arrian's column are therefore based on a number of assumptions and the length of the column an estimation[16]. On the basis of these calculations, Arrian's marching column may have been about 4.7km long, short enough to be easily controllable by the general who was riding up and down the line

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[13]The interpretation of scenes on Trajan's Column is at times highly problematic and by no means certain. Marching columns may have been divided to attack different objectives simultaneously (cf: Annals I 51) rather than to prevent them being surrounded (cf: Agric.25) or making them less vulnerable to enemy attack.

[14]Cohors III Ulpia Petraeorum sag. ∞ equitata had cavalry present but no infantry; Cohors IV Raetorum equitata, cavalry but no infantry; Cohors I Ituraeorum equitata, cavalry but no infantry; Cohors I Germanorum equitata ∞, cavalry but no infantry; Cohors I Lepidorum had only 200 men present; Legion XII was only present as a vexillation.

[15]Many of the difficulties listed here can be applied equally to Josephus' description of Vespasian's line of march.

[16]For these estimations and details of Arrian's order of march see below fig.vii.

(ektaxis 10) and for the line to deploy quickly into battle line. If this is approximately correct for Arrian's army of c.15,000 maximum, 28 km continues to appear excessive for an army of less than 60,000.

The length and width of the marching column could vary considerably and was not necessarily dictated by the size of the army; topography, the possibility of enemy attack and deploying into line of battle would also have to be considered when the line of march was drawn up. The fact that no recommended width for marching columns is given by any of the treatises suggests that, as with the line of battle, the exact width in numbers of soldiers was of less importance than the compromise between length and width mentioned by Onasander (see above p.105, and Chapter 6 on Pitched Battles).

Wheeler (1979 312) mentions a rule of thumb that width of column equals depth of battle line and on this basis Veith argued that the depth of the maniple and cohort was 6 from Josephus' description of Vespasian's line of march (Kromayer and Veith 1928 429). Wheeler takes this further on the evidence of Schulten's suggestion of legionary contubernia of 6 at Numantia to propose that the size of contubernium equals the width of the marching column, and presumably the depth of the battle line. Arrian's column of four abreast is therefore explained as half an Imperial contubernium of 8, split in this way because of the different weapons being used by the legionaries. Wheeler explains the change from 6 in the Flavian period to 8 under Arrian as the result of a tactical reform under Trajan or Hadrian.

It is always assumed, however, that the contubernium of 8 was introduced at the same time as the cohortal system during the late Republic. The contubernia in the de munitionibus castrorum are 8 and although Wheeler

accepts Birley's date of the reign of Marcus Aurelius for this work (1979 312), I have explained elsewhere my preferences for a much earlier date, in the 1st or early 2nd century AD, and therefore before any hypothetical Trajanic or Hadrianic reform (see Chapter 3 on The Organization of Units). I have argued above that the width of the marching column could be affected by other factors than simply the depth of the battle line, that the treatises do not recommend any particular column width or mention a numerical relationship between column width and depth of battle line. In addition, because it seems unlikely that Vespasian's army was expecting to engage in pitched battle, there need be no relationship whatsoever between the column width of 6 and the size of the contubernium and depth of battle line. It is only in the case of Arrian's column where the numbers are given that it is possible to suggest a direct relationship between width of column and depth of the legionaries in battle line.

Line of march and line of battle

The vulnerability of the line of march is mentioned by both Onasander and Vegetius (see above p.105), but an army was equally vulnerable to surprise attack when forming up a line of battle[17]. Deploying from line of march to line of battle was therefore a dangerous time for an army, so it was important that there was a close correlation between the two formations. This correlation is clearly visible in Polybius' description of the second type of marching formation. As suggested above (p.110), this system could no doubt have been adapted for use by a cohort legion, to form the triplex acies marching formation mentioned by Caesar. This may actually have been an easier

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[17]eg: Lucullus' attack on Mithridates' vast army when it was deploying, resulting in the total defeat of Mithridates (Plutarch Lucul.26-8; Appian Mithr.84-5; Frontinus Strat.II i 14).

manoeuvre than that described by Polybius because of the uniform armament of the legionaries[18].

Cavalry which acted as flank guards to the line of march would have an important role in protecting the infantry whilst they deployed into battle line. This cavalry screen could then quickly redeploy to the wings once the infantry was in place. Such a system could give the infantry time to deploy in relative safety as Arrian indicates (ektaxis 11). Analysis of the lines of march described in the historical sources and descriptions of battle lines illustrates the very close correlation between the two formations. A popular marching column in dangerous circumstances or when anticipating battle was cavalry at front and rear, legions in the centre and usually auxiliaries between the cavalry and legions (eg Annals I 51; XIII 40). This could easily be converted into one of the 'standard' battle lines of the Republic and Empire, with legions in the centre flanked by auxiliaries and with the cavalry on the wings (see Chapter 6 on Pitched Battles).

The details of manoeuvring from line of march to line of battle are not included in any of the histories and are conspicuously absent from the treatises, other than references to 'wheeling' into battle line or making a single turn to form the line (Jug.46; Annals I 51; II 16). Arrian's ektaxis is the only description of both march and battle line that survives in sufficient detail for analysis of this and although it is possible to indicate the position of various units in both

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[18]Polybius states that if the hastati were in the right column and the attack came from the left, a left turn to form the battle line would leave the hastati in the rear; they would then have to wheel round the other lines or pass through them. Walbank (1957 723) suggests that the triarii may have occupied the middle column of this marching line, so if an attack came from the right the principes would also have to manoeuvre in front of the triarii.

line of march and line of battle, the ἔκτασις does not describe how the units should redeploy.

As Arrian states, the cavalry formed a screen around the infantry to protect them during the dangerous period of redeployment. Since cavalry were stationed on all sides of the marching column, this would not have been particularly difficult. It seems likely that the column wheeled to the right to deploy with the units in the van taking up position on the right wing, those in the rear on the left wing and the legions in the centre of the column holding the centre of the battle line. Thus the infantry of Cohors I Italica and Cohors I Lepidorum held the right and left wing respectively because of their positions in the marching column, and in the same way Legion XV held the right and Legion XII the left of the heavy infantry (see fig.viii below)[19].

The infantry archers would withdraw from line of march to the rear of the intended battle line, allowing the legionaries to form up in their 8 ranks between the two hills on which the wings were anchored. A detachment of 100 archers from one of these auxiliary units would then join the left wing on the rising ground. The equites legionis and singulares would likewise have withdrawn to the rear of the line, along with the picked infantry, to serve as Arrian's bodyguard and reinforcements. The only noticeable difficulties are the deployment of the artillery and provincial militias on the two hills, particularly with the latter since they were at the rear of the marching column but unfortunately there is no further explanation of this. It is possible that the Armenian archers and the cavalry on the right wing actually marched ahead of the legions to facilitate their deployment. Once the infantry were

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[19]Legion XV may have held the right because that was traditionally the position of honour in any battle line (Veg.III 16) and the whole legion was present whereas Legion XII was only represented by a vexillation.

fully deployed, the cavalry could then move to their assigned positions on the wings behind the auxiliary infantry and the mounted archers behind the main battle line.

It is clear that Arrian's line of march was carefully thought out with his intended battle line in mind, and this must have been an important consideration for any general when drawing up a line of march which might have to deploy into battle line. Thus when Germanicus advanced against the Cherusci (Annals II 16) with the intention of sending his auxiliary infantry into battle first, they led the army so they could enter battle immediately without the need for elaborate redeployment. Under such circumstances, therefore, when an agmen quadratum or its Imperial equivalent was being used and an engagement was expected, the position of units in the intended battle line probably had more influence on the organization of the line of march than any other factor.

The General

Although the treatises do not deal with the position of the general on the line of march this, and his functions when the army was marching, can be inferred from the other literary evidence. As stated above (p.108), the commander's retinue and bodyguard was usually situated in the centre of the marching column, but the commander himself generally rode up and down the column encouraging his men, as Sallust describes:

> "On the march, Metellus moved up and down the column to see that no one left the ranks, that the men kept close together round their standards, and that each soldier carried his food and arms."
>
> Sallust Jug.45

> "Marius..went round every section of the army distributing praise and reprimands as they were deserved."
>
> Sallust Jug.100

Sulla (Sallust Jug.96) and Agricola (Agric.20) are also praised for the same actions, and Caesar seems to have done the same when his column came under attack, ordering in reinforcements when necessary (BG VII 67). According to Tacitus, Vespasian was accustomed to marching at the head of the column (Hist.II 5), and Arrian intended to ride along the column to ensure the soldiers remained in formation (ektaxis 10).

This is very much a literary topos and used by historians and biographers to illustrate the skills of a 'good' general, along with other qualities such as choosing the place for camp (Agric.20; Hist.II 5), or sharing the hardships with the soldiers (Plut.Mar.7; Hist.II 5)[20]. The fact that this is a topos does not matter, nor that the literary sources deal with the topic in an almost formulaic manner. Riding along the marching column was obviously considered one of the attributes of a good commander whether it is mentioned in the treatises or not, just as riding around the lines was in a pitched battle (see Chapter 6 on Pitched Battles). Arrian was clearly aware of this, the importance of encouraging and reprimanding his soldiers on the march when necessary and, of particular importance, ensuring that they remained in ranks.

Conclusions

Comparison of the advice contained in the treatises with descriptions of the order of march in histories and other literary works shows the close correspondence between the two. The overall organization of the marching column generally reflects the advice in the treatises, and the literary evidence

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[20]The language used is also very similar; Tacitus on Agricola choosing campsites - loca castris ipse capere (Agric.20); on Vespasian - locum castris capere (Hist.II 5). As Ogilvie and Richmond point out, Sallust on Sulla - in agmine...multus adesse (Jug.96); Tacitus on Agricola multus in agmine (Agric.20).

illustrates clearly the two different formations, for use in friendly territory or when the possibility of attack was very low, and the column for passing through hostile territory when an enemy attack was likely or the column was likely to have to form up a line of battle.

Vegetius as usual is far more rigid in his advice than Onasander, recommending a single formation, of the second type. Onasander, typically, provides outline advice but leaves it to the general himself to add the details depending upon the individual situation. Despite their different approaches, they both have the same concerns, particularly the dangers of being attacked on the march, a very relevant concern considering the number of times marching columns did come under attack.

There is no hint in the treatises of any importance being attached to the width in men of the marching column; the concern is with the column being wide enough to withstand a flank attack, and it is possible to see a correlation between width of column and depth of battle line only in Arrian's ektaxis. It is perhaps surprising that the treatises do not consider the deployment of the line of march into battle line, though this may be because of the close relationship between the two formations and the ease with which this redeployment could take place, a constant theme of the historical narratives (see above p.110). Although there are a few problems in attempting to trace the manoeuvres involved in turning Arrian's line of march to battle line, again the relationship between the two is clearly indicated. Thus when an army on the march was likely to face an attack or a pitched battle, the position of the troops in the battle line is likely to have had more influence on the order of march than any other factor.

The usual order of march of an army is therefore unlikely to undergo a major alteration unless there was a major change in the deployment of troops in the line of battle. On the whole, there was no such change from the mid Republic to the mid Empire, although the one variation introduced, the use of auxiliary infantry in front of the legions, is reflected in Germanicus' march against the Cherusci (Annals II 16; see also below Chapter 6 on Pitched Battles). The military treatises reflect the usual field practices, though may also reflect the contents of established military regulations covering this subject and referred to by Tacitus (Annals XI 18).

Fig.vi: Orders of march from the literary sources

B.Jug.46

↑

Light armed auxiliaries + picked slingers & archers
Legions?

Cavalry interspersed with skirmishers on flanks.

Battle ensued.

B.Jug.100

↑

Light infantry
Legions
Light infantry

Cavalry + slingers & archers on flanks.

Battle ensued.

BG II 19

↑

6 Legions in light marching order
Baggage
2 New Legions

Cavalry & slingers + archers may have been positioned to protect line from flank attack.

Marching through hostile territory.

BG II 14

↑

In Triplex Acies formation

No battle

BG VIII 8

↑

3 veteran legions
Baggage train
1 Legion

Troops almost in line of battle.

Intended to join battle

Annals I 51

↑

Cavalry + Aux infantry
Legion I
Baggage train
Legion XXI
Legion V
Legion XX as rearguard
Socii
Some auxiliaries

The line of march could wheel directly into line of battle.

Annals I 64

↑

Same formation as above.

Annals II 16

↑

Gallic + German Aux.
Foot archers
4 legions
General + 2 Praet.
cohorts + picked cavalry
4 legions
Light armed auxiliaries
Mounted archers
Auxiliary cohorts

Could wheel directly into line of battle.

Annals XIII 40

↑

Cavalry
Foot archers
Legion III
Baggage train
Vex. Legion X
Legion VI
?Foot archers
Cavalry

Expecting ambush or battle

BJ III 115ff

↑

Aux. infantry + archers
Heavy infantry + cavalry
10 men from each century with entrenching gear
Pioneers to level route

Officers' equipment with mounted escort
General with foot + mounted escort
Legionary cavalry
Siege train
Officers with escort

Legions, marching 6 abreast
Baggage train

Auxiliary cohorts
Rearguard of light + heavy infantry + cavalry

Probably not anticipating battle

BJ V 39ff

↑

Allied forces
Syrian auxiliaries
Pioneers + surveyors

Officers' baggage train
General's escort
Legionary cavalry
Officers

Legions, marching 6 abreast
Baggage train

Mercenaries
Rearguard (also to keep watch on mercenaries)

Probably not anticipating battle.

Arrian

↑

Scouts
Aux. cavalry
Aux. infantry, flanked by cavalry
Equites singulares
Legionary cavalry

Siege train
Officers of Legion XV
Legion XV

Officers of Legion XII
Vex. Legion XII

Provincial militias
Aux. infantry
Baggage train
Aux. cavalry

Battle to follow.

Fig.vii: Hypothetical Reconstruction of Arrian's Line of March

Because of the problems involved in the reconstruction of Arrian's line of march mentioned above (p.118), the calculations below contain a number of estimations and assumptions:
i) All regular army units are assumed to be at full paper strength and the vexillation from Legion XII Fulminata 2000 strong. The strength of the provincial militia is estimated, as are the sizes of the artillery train and baggage train. In the latter case, because the march appears to be one to the battle site and no camp is to be constructed prior to the battle, it is assumed that the bulk of the army's baggage remains in camp.
ii) All infantry march in columns four abreast, the cavalry three abreast.
iii) The distances of 0.75m per infantry rank and 2.7m for cavalry ranks adopted by Gichon has also been used here.

UNIT	MAX NUMBER	LENGTH (metres)
Scouts	Not included in calculations	
Cavalry:		
Coh III Ulp. Petr. sag.∞ eq.	240	216
Ala II Ulp. Aurian.	512	460
Coh IV Raet.	120	108
Ala I Aug. Gemina Colon.	512	460
Coh I Itur. eq.	120	108
Coh III Aug. Cyr. eq.	120	108
Coh I Raet. eq.	120	108
Coh I Germ. eq.	240	216
	1984	1784
Infantry:		
Coh I Ital.	480	90
Coh III Aug. Cyr.	480	90
Coh I Bosp. ∞	800	150
Coh I Fl. Numid.	480	90
	2240	420
Equites Singulares	120	108
Equites Legionis	180	162
Artillery	?	100
Officers Legion XV	?	50
Legion XV Apollinaris	4800	900
Officers Legion XII	?	30
Legion XII Fulminata	2000	375
	7100+	1725
Infantry:		
Provincial militia	800?	150
Coh I Lepid.	200	38
Impedimenta	?	100
	1280+	340
Cavalry:		
Ala I Ulp. Dac.	512	460
	12866	4677
		c.3 miles

Figure viii: Suggested deployment of Arrian's line of march to line of battle.



Chapter 6: Pitched Battles

Introduction

The importance of the pitched battle in Roman warfare is indicated by the prominence the subject is given in the general military treatises, particularly Vegetius, and in the ancient historians. A pitched battle could turn the course of an entire war, for example Cynoscephalae in 197 BC and Pydna in 168 BC and, although perhaps not as dramatic as many sieges, could offer the historian an opportunity to exercise his literary abilities[1]. Because the result of a pitched battle could be so decisive and could never be assured, however great the force and the advantage, Vegetius suggests that it should only be resorted to when other ways of destroying or dissipating the enemy had failed (III.9). Ambushes, terror tactics or a scorched earth policy are the strategies he suggests should be attempted before resorting to pitched battle (III.25). Even when the commanding general had decided to offer a pitched battle, there were still many points that had to be taken into consideration, according to the treatise writers. These included timing and the nature of the terrain, the strengths and weaknesses of both armies, the use of reserves by both sides and the possibility of attacks in the flank and rear, as well as how pursuit or flight would be carried out.

This chapter will consider various aspects of pitched battles that are covered by the treatises; on choosing the time and place for battle, the disposition of units and use of different types of troops, and developments in these, pursuit, and the role of the general in battle. The chapter will consider in

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[1]Tacitus' account of the second battle of Cremona, for example, is very dramatic, including an encounter between father and son who were fighting on opposite sides, illustrating the horrors of civil war (Hist.III 25), and he puts across the excitement of and confusion of a night action (Hist.III 22-3).

particular the use of auxiliaries as the main striking force and the suggested re-introduction of the Greek style phalanx in the second century AD. Appendix 2 comprises summaries of pitched battles fought during the late Republic and early Empire and which are referred to in the text.

Sources

Onasander and Vegetius both offer advice on the choice of a site and a time for battle, the methods of drawing up troops and their deployment in battle. Vegetius' detailed description of legionary organization in book II introduces the subject of his third book, which is concerned with the procedures of the army in the field. Book II of Frontinus' stratagems provides exempla relating to all aspects of fighting pitched battles, from choosing a time and place for battle to retreating after a defeat. The exempla given can be used to illustrate the advice given by Onasander in particular and if the stratagems were written as an appendix to his treatise, the section of that work on general actions may have been very similar in content to that in Onasander[2]. Vegetius may have based much of book III on Frontinus' treatise, according to Schenk (1930 39-64). Certainly a lot of the advice given by Onasander and Vegetius is very similar and they agree on many matters, though they do offer contradictory advice on others.

Accounts of pitched battles in ancient historians can be confused and lacking in detail, making it difficult or impossible to analyze the military dispositions and tactics. In their accounts of the Boudiccan revolt, for example, both Tacitus and Dio spend far more time on the speeches given by the two leaders

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[2]For discussion of this suggestion, see Chapter 2 on the Literary Evidence.

than the actual battle[3]. Accounts of battles may include other rhetorical devices which may obscure the actual field practices in use, but despite these limitations, the histories can be very useful in the study of Roman battles. In addition, Caesar's commentaries and the Caesarian corpus provide much detail on contemporary military practices, with eye witness accounts of small and large scale pitched battles, and there is also Arrian's description of his battle plans for his campaign against the Alans. The Ἔκταξις κατ' Ἀλανων is of enormous value even though the plans never seem to have been put into operation. The advice given by the treatises on particular subjects relating to pitched battles will be discussed below under each section.

Preliminaries to Battle

The treatises provide little advice on when a pitched battle should be offered or accepted. Onasander does not mention the subject at all, but Vegetius states that "good officers never engage in general actions unless induced by opportunity or obliged by necessity." (III 25). He also suggests that other tactics should be employed before resorting to pitched battle. Frontinus may also have included in his treatise a section on choosing the time for battle since he provides several exempla on the subject in his stratagems (Strat.II i). However, these stratagems are all connected with the timing of the battle, not with the question of whether battle should be offered or not.

The exempla illustrate delaying troop deployment to get the advantage over an enemy worn out from hunger and exposure to the elements (eg: Strat.II i 1-2), attacks when the enemy is hampered by religious scruples (II i 16-17) and when the enemy is deploying his line of battle (II i 14). In many cases the use

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[3]Tacitus Annals XIV 35-6; Dio LXII 3-6; cf: the speeches before Mons Graupius, Agric.30-34, and the battle itself, Agric.35-7.

of such a stratagem would give the Romans a psychological advantage as well as a tactical one. Caesar forced Ariovistus' army to fight even though the Germans were reluctant to do so for superstitious reasons (BG I 50; Strat.II i 16). Lucullus, though greatly outnumbered, attacked Mithridates when the latter was still trying to deploy his huge army; the enemy line was in chaos and fled almost immediately[4]. The use of such a stratagem might also help to limit the number of casualties which was of importance to any general, particularly when the battle was just one in a campaign.

Neither Onasander nor Frontinus gives much consideration to the use of methods other than pitched battles to defeat an enemy or scare him off without an engagement[5]. Delaying tactics are mentioned by Frontinus in connection with the waging of a defensive war (Strat.I iii 3), but Fabius' tactics were to give Rome a breathing space in 217 BC after the disaster of Trasimene so her armies could prepare for the campaigns and battles to come. Vegetius, however, does not appear to be advocating delaying tactics, but rather only engaging when conditions were perfect (or when a battle was unavoidable), or not engaging at all. Vegetius appears to differ with the earlier writers on this matter, and the implications of this will be considered below.

Choice of Terrain

Onasander and Vegetius both stress the importance of the terrain where a pitched battle is to be fought, as they believe victory is greatly dependent on the nature of the battlefield (Veg.III 14). The general must choose the type of terrain to suit the strengths and weaknesses of his troops and those of the

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[4]The accounts of Lucullus' battle are very similar; Plutarch Lucul.26-8; Appian Mithr.84-5; Strat.II i 14.

[5]The latter seems to have been Arrian's intention (ektaxis), and according to Dio (LXIX 15) he was successful.

enemy; if the strength is in the cavalry, according to Onasander, rough and constricted ground near hilly country should be chosen (XXXI), but Vegetius advises plains and open ground for cavalry and cut-up, hilly or woody areas if the infantry is stronger (III 13). Vegetius mentions the importance of holding high ground because of the advantage of throwing weapons and firing missiles with greater force, and it is difficult for troops climbing a hill to engage. He suggests using other natural advantages, such as arranging troops so that the sun, dust and wind are in the face of the enemy (III 14). Such is the importance of the field of battle that Onasander recommends avoiding battle until a suitable place is found (XXXI). Frontinus provides exempla for some of the tactics mentioned above, particularly the use of high ground for throwing missiles and charging down from (Strat.II ii 2-4), and deploying so the enemy is forced to face the sun, dust and wind (II ii 7-8), though he also mentions using natural features to protect the flanks (II ii 6) and deploying in a confined area to embarrass a large army (II ii 1).

Since the nature of the terrain could affect the outcome of a battle, it was important whenever possible to choose a place to fight that was suitable for the forces a general had at his disposal. Obviously this was not always possible, for example if the army was attacked on the march, but even then it was possible to make use of any natural phenomena that could be of use, or construct field-works to provide some kind of protection.

The accounts of pitched battles do not give much indication that the strengths and weaknesses of the two armies had a great deal of effect on the choice of the terrain. It is rather the deployment of the line of battle that is tailored to suit these strengths and weaknesses (see below). Indeed, Tacitus has Germanicus at Idistaviso remark that "open ground is not the only battle field

available to a Roman. Woods and forests are good too, if he acts sensibly." (Annals II 16). The contradiction between Onasander and Vegetius concerning the suitability of terrain for cavalry is odd because all the commentaries and literary sources agree with Vegetius that plains and open ground are best for cavalry. Indeed, Caesar mentions that in one battle the infantry would be entirely surrounded by cavalry because the engagement would take place on flat, open ground (BC I 71), and the author of the Bellum Hispaniense mentions that conditions at Munda were entirely suitable for cavalry as the terrain was flat and the weather calm and sunny (B.Hisp.29).

Roman generals seem to have been far more concerned about holding high ground in a pitched battle or in preparation for one. The two main advantages are pointed out by Vegetius; the extra height increased the range and effectiveness of artillery, and made it harder for the enemy to engage. It also meant that an attacking army would be able to charge down on the enemy with greater force, and it was better also for an army on the defensive. Frontinus reports that Pompey easily overcame Mithridates in one encounter because his army charged down onto Mithridates' troops (Strat.II ii 2). The advantage of high ground for the use of artillery and other missiles is mentioned frequently by historians and treatise writers alike (Veg.III 14; Strat.II ii 3; BG VIII.14; B.Alex.73-76; ektaxis 19). Both Caesar and Arrian proposed to site artillery on high ground to take advantage of the extra range that would be provided and, perhaps more importantly, to protect their flanks. In neither case did an engagement actually take place, in the former because the Bellovaci had more sense than to engage the Romans in such formidable circumstances.

It was only an advantage to hold the high ground if the enemy attacked despite the difficulty of the terrain; during the civil wars in Spain Marcellus refused

to let his army engage that of Q.Cassius because the latter had drawn up his troops on high ground and Marcellus knew his troops would be seriously disadvantaged if they did attempt to storm the hill (B.Alex.60). The difficulties of engaging a force by attacking uphill are illustrated in Tacitus' account of Mons Graupius (Agric.36). The trick of using ground to the advantage seems to have been to hold the position most favourable to the troops and most unfavourable to the enemy, and still get the enemy to engage.

Where Roman heavy infantry did have problems was in marshy ground. Caesar was concerned about his battle line at Munda because it had to negotiate a marshy river in order to engage the Pompeian troops (B.Hisp.29), and Germanicus' army in Germany had severe problems trying to fight the tribes in the marshlands of the lower Rhine (Annals I 64). Tacitus states that the ground was too soft for their heavy armour and made it impossible to throw missiles, whereas the Cherusci, according to the historian, were long limbed, naturally suited to marsh dwelling, and had long spears suitable for fighting in this kind of terrain.

None of the treatises mentions the use of "specialist" troops other than cavalry, and the Roman army does not appear to have had many. However, under similar circumstances in Britain, Aulus Plautius made use of German auxiliaries who could swim across rivers in full armour, at the battle of the "Medway" (Dio LX 20). These have been identified as Batavians (Hassall 1970 131-6), and they were also the first troops to cross the Thames (Dio LX 20), as well as having important roles in the two attacks on Anglesey (Annals XIV 29, Agric.18). Batavians also fought in a more conventional role at Mons Graupius (Agric.36), and it would perhaps be incorrect to describe them as

"specialist" troops. More likely, any general would make use of any particular abilities his soldiers might possess.

In addition to using the terrain to his advantage, the general was also advised to take advantage of natural phenomena. Vegetius recommended deploying so the enemy would get the sun, dust and wind in his face (III 14; see above p.135). This, according to some sources, is what Hannibal did at Cannae, so the Romans got the dust blowing in their faces (Livy XXII 43; Strat.II ii 7), but Polybius says that both sides deployed so that neither was put at a disadvantage by the rising sun (Polybius III 114). It is not always possible to tell whether a general took such factors into account when deploying his troops or not; Marius deployed his troops against the Cimbri and Teutones so that the Germans had to face the sun, dust and wind, but there may well have been other factors affecting the Roman and barbarian dispositions not mentioned by the sources (Strat.II ii 8; Plut.Mar.26). Plutarch, for example, gives no indication that Marius arranged his line of battle with this intention. Certainly at the second battle of Cremona it seems to have been completely by accident that the Vitellians found themselves facing the rising moon, causing them to fire their artillery off target, and to be illuminated by the moonlight and provide excellent targets for the Flavian troops to aim at (Hist.III.23)[6].

One of the best ways to take advantage of the terrain was to use natural obstacles to prevent any chance of being outflanked. Such a preventative measure was particularly important as an army was at its most vulnerable when attacked on its flanks or at the rear, as happened to the Macedonian phalanx at Cynoscephalae in 197 BC (Polybius XVIII 26). The manoeuvrability of the

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[6]It seems quite likely that the line of retreat would be a more important consideration than where the sun rose (see below p.171).

Roman manipular and cohort systems aided both the execution of outflanking movements, as illustrated at Cynoscephalae, and their prevention; with the cohort system it was possible for the rear cohorts of the line of battle to turn and meet an enemy coming from behind which the phalangists were unable to do. When Caesar's troops were surrounded by Labienus' cavalry during the civil wars, Caesar extended his line and ordered every other cohort to turn about, thereby fighting the battle on two fronts (B.Afr.12). However, despite the flexibility of the Roman system, it was obviously better to prevent such a possibility. Onasander advises using natural features to secure one wing (XXI), and one of Vegetius' seven battle arrangements also advises this (III 20). Frontinus gives one example of the use of this stratagem (II ii 6) but many more may be found in the histories.

Appian states that the Roman left wing at Magnesia was secured by a river (XI 31ff), and at Pharsalus Pompey secured his right wing with a stream so he could concentrate his cavalry and light infantry on the left wing. Caesar was thereby forced to make alterations to his own line of battle to counter his opponent's strong left wing (BC III 88-9)[7]. Germanicus at Idistaviso (Annals II 16) and Cerialis against Civilis (Hist.IV 16) fought pitched battles close to the rivers Weser and Rhine respectively and may well have used them to secure one wing.

This strategy could be taken further and natural features could be used to anchor both wings as Arrian intended to do for his engagement with the Alani

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[7]The alteration comprised ordering one cohort from each legion from his third line and positioning them on his right wing to oppose the extra forces on Pompey's left wing (BC III.89), again illustrating the flexibility of the cohort system.

(ἔκταξις 12)[8]. Suetonius Paulinus, when faced with the huge army of Boudicca, positioned his line of battle in a steep sided valley to secure his wings, and with a wood at his rear to prevent outflanking movements, or an attack from the rear (Annals XIV 34).

Fieldworks

When natural obstacles were not available, an alternative was to dig entrenchments to protect the flanks, a practice that is not mentioned by any of the military treatise writers. Nevertheless, there are several examples of this, mainly from the late Republic. Caesar had used fortifications to protect his flanks from cavalry when he was attacking the town of Uzitta (B.Afr.51), and although this was more in preparation for storming the town than fighting a pitched battle, the purpose was essentially the same. He later used the same fortifications to secure the right wing of his battle line (B.Afr.60). More details are provided about the field works dug by Pharnaces to protect his flanks in battle against Domitius (B.Alex.37). He dug two straight trenches 4ft deep and fairly close together to the point beyond which he had decided not to advance his battle line, then drew up the infantry within the trenches and his cavalry outside. Because of unfavourable ground at Munda, Caesar began to restrict the operational area (locum definire coepit). This may have involved digging trenches similar to those mentioned above. Caesar's men complained that this would hamper their chance of deciding the conflict, but the account does not mention whether the operations were completed (B.Hisp.30).

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[8]Such a strategy, however, would almost certainly involve fighting a battle under particular topographical circumstances; Arrian mentions that the battle will be fought at an appointed place (ektaxis 11).

Caesar had previously used entrenchments in Gaul against the Belgae in 57 BC (BG II.9). He states that he had trenches dug on his right wing about 400ft to the front and rear of his battle line. Forts and artillery were positioned at the end of each trench. Frontinus mentions that Sulla dug similar entrenchments to protect both his wings from envelopment by Archelaus' army (Strat.II iii 17). Napoleon III and Stoffel carried out investigations on a series of Roman fieldworks at Mauchamp, Aisne. These comprised a marching camp of 41 hectares with additional entrenchments running from the N.W and S.E angles of the camp. Napoleon claimed that the end of the S.E trench was destroyed by the river Aisne, but the N.W trench appeared to be complete and is c.700m long, slightly more than the figure given by Caesar, and reaches almost to the Miette, a tributary of the Aisne. The dimensions of the trench are not known, but it would presumably have been wide and deep enough to break up a cavalry charge or hamper an infantry attack. Of the artillery emplacements at the end of each trench, only the northern one survives, and its outline is irregular; Napoleon could not explain it. The trenches of the redoubts are fairly shallow (20 cm-1m) but their main purpose seems to have been as a base for Caesar's artillery[9].

Caesar's entrenchments were to prevent his battle line being outflanked and the fieldworks at Mauchamp seem to be adequate for this purpose, especially as the lines linked the camp with the rivers Aisne and Miette, a further

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[9]The identification of these fieldworks as the site of Caesar's battle in 57 BC has been hotly disputed (the earlier arguments are summarized by Rice Holmes 1911 659-68, the later by Goudineau 1990? 250). These arguments include the use of claviculae in the marching camp as indicators that the camp is later than Caesar's campaigns and that the dimensions do not correspond exactly with those given by Caesar. However, marching camps are very difficult to date and it is impossible to say when the clavicula came into use. The fact that the dimensions of the ditch do not correspond with the literary evidence is not important; Caesar's orders may not have been carried out to the letter.

obstacle to any Belgic outflanking manoeuvres[10]. Tacitus mentions that Suetonius Paulinus spent time preparing for the first battle of Cremona by filling in ditches etc. (Hist.II 25); on the difficulties of the terrain here see below (p.142).

Favourable Ground

Ideally any general would wish to engage the enemy on favourable ground and concern about this is clearly illustrated in Caesar's commentaries. On several occasions a battle is avoided or delayed because of the unfavourable nature of the ground (eg: BG V 49; BC II 34), and the Roman defeat at Gergovia is blamed on the unfavourable ground (BG VII 53). From Caesar's comments, it is obvious that for him "favourable ground" was either flat, open ground, which would also be suitable for cavalry (see above p.136), or ground sloping down towards the enemy. Engaging an enemy which required climbing a hill was considered a definite disadvantage, and during the civil wars neither Curio nor Varus was eager to engage because it would have meant climbing steep slopes (BC II 34)[11]. The difficulties of unfavourable ground are illustrated at the 1st battle of Cremona:

> "the battle line was broken up by the nature of the ground which was full of trenches and pits, and in avoiding or going around these the men were compelled to engage their opponents at a disadvantage and in small groups"
>
> (Plut.Otho 12).

No doubt before a battle started a great deal of marching and counter-marching would have taken place as the opposing armies aimed for the most advantageous terrain.

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[10]The newly recruited legions remaining in camp for use as reinforcements could have dealt with any concerted enemy attempt to cross Caesar's trenches and outflank his battle line.

[11]Ostorius Scapula's troops faced a similar difficulty in Wales when they had to storm a defensive position on a hilltop (Annals XII 35).

As stated above, Onasander recommends avoiding battle until a suitable place is found (XXXI). Again it is from Caesar than an example of this strategy comes; one of Caesar's legates, Sabinus, wished to avoid battle with Viridovix because of Caesar's absence and the size of the enemy "unless he enjoyed the advantage of position or some particularly favourable opportunity presented itself." (BG III 17, in 56 BC)[12]. Arrian, in addition, proposed to fight his battle in specific topographical circumstances (ektaxis 12). He intended to fight in a horned formation with both wings held by detachments stationed on rising ground. Arrian does not say what he intended to do if the Alans decided to fight him when there was not a convenient pair of hills that he could anchor his battle line on, but the terrain is important to the effectiveness of his dispositions[13].

Disposition of Forces: Treatises

Both Onasander and Vegetius mention the importance of planning the battle dispositions in advance, especially deciding who is to oppose whom, for example, the cavalry should be deployed against the enemy cavalry (Onas.XVI), and of making these dispositions with great care (Onas.XXX; Veg.III 14), because even with the best soldiers, a bad battle line will be broken up (Veg.III 14). Vegetius advises his general to deploy his troops in battle line awaiting the enemy so that there will be no interference of obstructions from the enemy, and it will give the Roman troops a psychological

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[12]This also reflects the advice given by Vegetius that a general should not engage "unless induced by opportunity or obliged by necessity" (III 25).

[13]Rome's enemies also made use of terrain they knew would be unsuitable or difficult for Roman troops, eg: the Iceni made their stand in a restricted area where the Romans could not make use of their cavalry (Annals XII 31), and see also below p.163.

advantage (III 11 & 17)[14]. Onasander, perhaps more shrewdly, states that sometimes it is an advantage to wait for the enemy to deploy first so the general can make his dispositions taking into account the enemy's dispositions (XXXIX). He adds that plans made at the time of battle are sometimes better than those made before the engagement because some things cannot be reduced to rules or planned beforehand (XXXII).

Both Onasander and Vegetius state that there were many different types of battle formation depending on the type of soldiers the general has, their arms, the terrain and the strength of the enemy (XV). As far as the width and depth of the main body of troops is concerned, a compromise should be made between being too long and narrow so that the enemy can easily burst through the line and attack from the rear, and so compact that the line is easily outflanked (Onas.XXI; Veg.III 15)[15]. Vegetius suggests two arrangements for the battle line (II 15; III 14), whereas Onasander is much less specific; he simply states that the cavalry should face the enemy cavalry (XVI) and that light troops should be posted in front of the main body of infantry to provoke the enemy to battle, then retire through intervals left within the ranks of the heavy infantry. The light troops should also carry out the pursuit (Onas.XIX). This sounds very much like the descriptions of the Roman legion by both Polybius and Livy, but Vegetius' two descriptions are also on the same lines.

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[14]Perhaps this is related to the use of inexperienced or weak Roman forces in the late Empire.

[15]The same consideration was necessary for the line of march (see above Chapter 5).

His first arrangement has the main infantry force of principes and hastati in two lines (5 cohorts each)[16]. Cavalry are stationed on either side of the battle line. A third line of heavy infantry (triarii) remain at the rear as a reserve. Light troops provoked the enemy to battle and pursued them if they fled. If not, the light troops retired through the ranks and the legions fought. If the enemy fled, they would be pursued by the cavalry and light troops. The second arrangement was fairly similar, with the front ranks composed of legionaries (principes and hastati) and cavalry, then two ranks of light troops whose duties were, as above, to provoke the enemy to battle and, with the cavalry, to carry out the pursuit. Behind these was a line of artillery and slingers, then a reserve force of scutati and triarii. Other reserve bodies of cavalry and infantry were to be kept in the rear. The similarities between this description and those of Polybius and Livy suggest that Vegetius may have used a Republican source such as Cato for this section as he does elsewhere (II 3; see below note 19, 20).

Vegetius goes into greater detail, explaining the intervals between each man in the line, 3ft, and each rank, 6ft (III 15), and later describes seven different arrangements for the force described above, depending on the strengths and weaknesses of the enemy (III 20)[17]. Finally, Onasander states that in the absence of light troops the front ranks should form a tortoise (testudo) to protect themselves from enemy fire until the enemy have discharged all their missiles (XXI).

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[16]For discussion of these arrangements, see below p.152.

[17]The last of these has a flank protected by a natural obstacle, cf: Onasander XXI and above p.139.

Unlike Vegetius who throughout books II and III concentrates on the legions, Onasander gives particular prominence to the role of light troops. He points out that by stationing archers in front of the line, they are able to fire with more force directly at the enemy whereas if they are behind the heavy infantry and have to fire over the heads of the infantry, their missiles will not be as forceful (XVII). These troops should also be used to attack the enemy's flanks, especially with missiles, as the flanks are more vulnerable than the front and the enemy line will be forced together and become confused (XIX - XX). Light troops should be used in broken country, and to dislodge enemy forces holding high ground (Onas.XVIII).

Reserves should be kept at the rear of the main force (Onas.XXII; Veg.III 18). The Vegetian line had three groups of reserves, one near the right to attack the enemy flank, one in the centre for carrying out manoeuvres in the line requiring more troops, such as forming wedges and pincers, and one on the left of the wing to prevent the wing from being surrounded. Onasander states that the reserves are for emergencies and are particularly useful for carrying out a sudden attack on the enemy's rear.

Disposition of Forces: Field Practices

The literary evidence confirms the importance of the advance planning mentioned by the treatises. Caesar frequently held councils of war with his legates, tribunes and senior centurions (BG IV 13, VI 5, VII 45; Labienus holding councils of war, BG VI 5, VII 60) and Arrian's Τακτικὴ describes his proposed order of march and battle dispositions. The question of deploying troops before or after the enemy varies, as Onasander points out (XXXIII), on circumstances. The deployment of a battle line could take some time, and

this was a particularly vulnerable state for an army to be in; Lucullus' defeat of Mithridates was primarily due to his attack on the Pontic forces before they were fully deployed (see above p.134)[18]. However, the advantage mentioned by Onasander (XXXII), of deploying after the enemy, is well illustrated at Pharsalus. On studying Pompey's dispositions, Caesar saw that he had posted all his light troops and cavalry on his left wing. Since this seriously endangered his own right wing, Caesar took one cohort from each legion's third line and posted them all to his right, giving him an advantage (BC III 89).

Concern about the width and depth of the battle line (see above p.144) is best illustrated by Agricola's line at Mons Graupius (Agric.35). According to Tacitus, Agricola was concerned about being outflanked so he opened out the ranks. There were suggestions that the line was too thin as a result of this manoeuvre, but this does not seem to have been a weakness during the actual battle. The construction of the fieldworks mentioned above (p.140) may not have been simply to protect against flank attacks, but on some occasions may have served to restrict the line of battle as well. Caesar's attempts to "restrict the operational area" at Munda (B.Hisp.30) may have involved digging trenches, as suggested above, and if so they may have been intended to keep the battle line within certain limits as well as to protect against flank attacks[19].

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[18]cf: Caesar's difficulties against the Nervii when his army was taken by surprise BG II 20. To guard against this, there had to be a relationship between the order of march and line of battle; see above Chapter 5 on The Order of March.

[19]On the one occasion Caesar formed up a single line (simplex acies), he was forced to order his men not to advance more than 4ft from the standards, because the line had become too disorganized.

Although both Livy (VIII 3-18) and Polybius (VI 19-25) describe the deployment and tactics of the Republican legion in battle, they do not indicate where in the line of battle the socii fought. Since both historians, however, describe a number of set piece battles, including some comment on the dispositions of the Roman army and socii, it is possible to indicate a "standard" line of battle for a Roman army during the Republic. Using Caesar, Arrian and the limited information available from Tacitus and other historians of the Imperial period, some idea of military dispositions in the late Republic and early Empire may be obtained, and thus a comparison is possible between actual battle dispositions and those advised by the treatise writers. The similarities between Vegetius' first description of the battle line (II 15) and the "standard" battle line of the Republic have been noted above (pp.144-145), and his information may well have come from one of the Republican treatises[20].

The "standard" battle line of the Republic, according to Polybius and Livy, was as follows:

1. A screen of light infantry (velites) to provoke the enemy to battle, then retire through the ranks of heavy infantry. The velites would also assist the cavalry in pursuing a fleeing enemy.

2. The heavy infantry would take up the fight in the three lines of hastati, principes and triarii. The latter acted as a reserve force in the rear and could also be used for outflanking manoeuvres (eg: Cynoscephalae 197 BC).

3. The socii were stationed between the legions and cavalry and employed the same system of velites, hastati, principes and triarii as the legions (Livy VIII 8).

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[20]Webster (1985 231) suggests Vegetius obtained this information from Frontinus, but Vegetius also mentions Cato as a source (II 3), and perhaps this is a more likely source for Vegetius' description of the Republican legion.

4. The cavalry on the wings opposed the enemy cavalry, prevented outflanking manoeuvres and carried out the pursuit.
The line of battle was intended to break the enemy line and cause the enemy to flee, when most casualties would be caused (see below p.170).

This formation is used by the Romans on many occasions including the Trebbia, Cannae, the Great Plains against Hasdrubal Gisgo, Cynoscephalae (Polybius III 72, 113; XIV 8; XVIII 23-7), and Polybius describes it as the regular deployment of the Roman army (III 72; XIV 8). There were, of course, exceptions, usually for a particular tactical reason, for which Frontinus gives examples (Strat.II iii 4, 16, 17)[21].

The adoption of a tactical system based on the cohort instead of the maniple does not seem to have had a great deal of affect on the general dispositions of the line of battle, with the exception of the velites. The evidence from Caesar and the "Caesarian corpus" shows that usually the legions held the centre of the line with the auxiliary infantry on either side, and the auxiliary cavalry on the wings. The major difference is the absence of the velites in the front of the line. In the late Republic it was usually the front ranks of heavy infantry engaged first, throwing their pila and then engaging in hand to hand combat (BG I 52). Such light infantry that were used in this period were usually placed on the wings, between the heavy infantry and cavalry, and were frequently "specialist" troops such as slingers and archers (eg: Caesar's line at Thapsus B.Afr.79[22]), or with the cavalry to improve their

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[21]Strat. II iii 4; Scipio changed his usual battle line suddenly to confuse Hasdrubal, stationing his strongest troops on the wings and carrying out a flank attack.

[22]Caesar also on occasion stationed auxiliaries at the front of his own battle line, eg: B.Afr.12, but these are archers rather than auxiliary infantry, cf: Onasander XVII and below p.154.

effectiveness (BG II 23; BC II 34; B.Afr.69, 72; B.Hisp.14). The role of the cavalry remains the same throughout the Republic and early Empire; to oppose the enemy cavalry, prevent outflanking manoeuvres and pursue a fleeing enemy.

In the early Empire there appear to be two types of disposition in regular use. The first was simply the continuation of the old Republican system with the legions holding the centre of the line and auxiliary infantry, then auxiliary cavalry on the wings. As with dispositions in the late Republic, there is little evidence of the use of light infantry in front of the main line of infantry (eg: Annals II 52; XIII 38, although there was no actual battle; XIV 34; two battles at Cremona, Hist.I 24; III 21-22). Arrian's proposed dispositions against the Alani are also a variant on this, though see below (p.165).

In the second arrangement the auxiliary infantry was deployed in front of the legions and cavalry were posted on the wings (eg: Hist.V 16; Agric.35). This, however, is not a return to the system of the middle Republic with the light troops provoking the enemy to battle and then withdrawing; the auxiliaries acted as the principal striking force and the legions were held in reserve (Agric.35). The reason behind the use of this variant has generated much discussion and this will be considered below (p.153).

Legions

Further details are available from Caesar on the deployment of his legions in battle. His usual formation was the duplex or triplex acies though on rare occasions a simplex or quadruplex acies was used. These formations refer to the depth in cohorts of the battle line, the system providing sufficient flexibility for the general to compromise between a line that was too short or

too thin (see above p.144). The triplex acies has been described as the standard for the late Republic, with the cohorts arranged in a 4-3-3 formation (Rice Holmes 1911 587-99). In normal circumstances, this would appear to be tactically sound, especially with regard to the length/width compromise mentioned above. The middle line of three cohorts would act as the reserves mentioned by Vegetius and Onasander whilst the rear line could carry out outflanking manoeuvres and if necessary turn around to face an enemy attacking from the rear[23]. The duplex acies was presumably a 5-5 formation of cohorts which gives fewer reinforcements and reserves but a longer line to prevent outflanking manoeuvres[24]. A study of Caesar and the Caesarian corpus indicates that these two acies, and variations on them, are the most regularly used during this period.

As stated above, the simplex and quadruplex acies were rarely used, and this was usually for a specific tactical reason. Caesar only once used a simplex acies (B.Afr. 13), and this was through concern that his small force might be outflanked by Labienus' cavalry, sacrificing prevention of the enemy bursting through his thin line to avoid the greater danger of a flank or rear attack[25]. Caesar states that Scipio's normal line of battle was the quadruplex acies, but his first line was made up of cavalry interspersed with elephants (B.Afr. 41), probably with a triplex acies of legionaries behind this. To oppose and outflank these elephants at Uzitta, Caesar sent reinforcements to each wing

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[23]Vegetius III 18 and Onasander XXII discuss reserves at the rear of the line, and see below p.160. At Pharsalus, as stated above, Caesar ordered one cohort from each legion's reserve third line to reinforce his right wing (BC III 89). For the third line of cohorts turning to face attack from the rear, see BG I 24.

[24]cf: Vegetius' description of legionary deployment II 15, but see also below p.152.

[25]When this did in fact happen, the flexibility of the cohort system allowed him to turn round every other cohort in the line to repulse this new attack.

to create a fourth line of cohorts (B.Afr.81). The manoeuvre is similar to that at Pharsalus mentioned above (BC III 89), and again illustrates the advantages of the cohort system.

No details are available for the deployment of legionary cohorts in the battle line of the Empire before Vegetius' de Re Militari, though it would not be unreasonable to suppose that they were similar to those of the late Republic. Vegetius' descriptions of legionary deployment are, however, confused. His first (II 15) initially appears to be the duplex acies with two lines of five cohorts, but there is also the reserve line of heavy infantry, the triarii. Silhanek suggests that this represents Caesar's triplex acies (1972 167-8) but fails to indicate where the third line, the reserves, comes from (see below). A line similar to this was in use in the late Republic with two lines of legionaries and auxiliaries in the rear (eg: BC I 83), but Caesar specifies that it is a duplex acies, it is not triplex, and indeed it is at this point that Caesar explains the 4-3-3 formation of the triplex acies.

There seems little doubt that Vegetius' triarii here are legionaries, and if the hastati and principes represent all ten cohorts of the legion, there is no source for the force of reserves. It seems much more likely that Vegetius, in his confusion, has here combined elements of both the manipular and cohort systems. As far as the organization of the legion is concerned, Vegetius deals almost exclusively in terms of centuries and cohorts, and this suggests that he is using a late Republican or Imperial source for this. However, his systems of legionary deployment (II 15, III 14) owe more to the mid Republic, Polybius, Livy and probably Cato (see above p.145). Vegetius appears unaware of the change from the manipular to cohort system, or is using

sources relating to both types, and his battle line is therefore a synthesis of both.

Auxiliaries

As stated above (p.146), Vegetius' main interest is in the legions whilst Onasander emphasises the role of light troops. Both writers, however, indicate that their principal role was to incite the enemy to battle before retiring through the lines of heavy infantry, and to carry out the pursuit with the cavalry. This was, indeed, their main role during the Republic, but well before Onasander was writing, the former role had declined and during the civil wars of the late Republic, auxiliaries were rarely posted at the front of the line.

The general impression gained from the writers of this period is that the fighting abilities of many auxiliaries were suspect. Appian states that the auxiliaries at Pharsalus were more for show than for use (BC II 75ff) and Crassus' reasoning behind posting of his auxiliaries in the centre of the line between the legions was lack of confidence in them (BG III 24). Domitius Calvinus placed the 'legions' supplied by Deiotarus in the centre of his battle line, with a small frontage, because he also lacked trust in their strength (B.Alex.38-40). Rice-Holmes suggests that the auxiliaries would fight better if supported and encouraged by being near the legionaries (1914 124)[26]. Caesar may have had this in mind when he positioned his auxiliary infantry in between the legionaries entrenching camp (BC I 73). He also used auxiliaries to guard his camp during battle (BG I 24; I 50, the former occasion along with

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[26]This is no doubt true, but in Crassus' case the auxiliaries may have been archers or slingers (unfortunately Caesar gives no details), and the placing of these in the centre of his battle line would have been tactically sound (cf: BC I 81-3).

recently recruited legions whose abilities he seems also to have doubted). The auxiliary infantry, however, was occasionally used as a reserve force, to carry out outflanking manoeuvres (cf: Uzitta) or deal with a new threat when the main legionary force was already engaged (BG II 8ff). Although the role of auxiliary infantry in the late Republic seems to have been fairly minor, there was a much greater role for slingers and archers and cavalry.

Onasander suggests two positions for slingers and archers; in front of the line, to fire directly at the enemy line, and on the wings to carry out flank attacks. Analysis of their dispositions in the late Republic and early Empire suggests that these were, indeed, the principal uses of these forces. At Pharsalus Pompey positioned archers on his left wing for the specific purpose of attacking the right flank of Caesar's line, and the emphasis of archers on Scipio's wings at Uzitta suggests this was the intention here as well. Unfortunately the lack of detail for Imperial dispositions prohibits similar analysis. Archers are illustrated in action on Trajan's Column (scenes 177-9; 310) and in both cases they are depicted shooting from behind other auxiliary troops, a position which Onasander criticizes because the archers are unable to fire with such force. However, the Column may not provide an accurate representation of the use of these auxiliaries in the field. Arrian's mounted and foot archers are also positioned with the artillery at the rear of his battle line and on the flanks (ektaxis 12-13). 32 units of archers are attested during the Empire (Holder 1980 appendix 3), 4 alae, 6 cohortes equitatae and 22 cohorts; two cohortes equitatae and two cohorts are known to have been milliary, indicating their continued importance[27].

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[27]Milliary cohorts of archers: Cohors I Ituraeorum, AE 1907 50; Cohors I Hemesenorum; cohortes equitatae: Cohors III Ulpia Petraeorum AE 1924 81; Cohors I Damascenorum ILS 1998, 2585. Artillery could take the place of archers positioned at the front of the line, eg: Cremona II. Onasander (continued...)

Slingers are illustrated fighting along with the archers (Trajan's Column scene 310) and in the historical literature slingers and archers very frequently fight together, sometimes with other missile throwing auxiliaries such as iaculatores[28]. Livy and Tacitus both indicate two types of slingers, funditores, the more common type, and libratores (Livy 42 65; Annals II 20; XIII 39). The differences between the two types are not known, but it is possible that the libratores may have used a sling staff. Unlike archers though, no units of slingers are attested epigraphically during the Empire, though the evidence proves that they still had a role in pitched battles. Hadrian's address to the army in Africa suggests that practice in the use of slings may have been a general requirement (CIL VIII 2532) and although auxiliary units were often identified by their weapons in the late Republic (Saddington 1982 140), this is not so common in the Empire. Cohorts made up exclusively of slingers may not have continued to exist during this period but slingers certainly continued to play a role along with archers and artillery in supplying the army's fire power.

What Onasander does not mention is the vulnerability of these troops if surrounded by enemy infantry or cavalry, but this is clearly illustrated at Pharsalus. Pompey's archers were protected by his cavalry, but when these were driven off by Caesar's cavalry the archers and slingers were left exposed. These were massacred by Caesar's advancing infantry. At

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[27](...continued)
recommends placing the archers here so they can fire at the enemy with greater force (XVII). The difficulties of the Flavian troops at the second battle of Cremona indicates how serious an obstacle artillery could be when sited here.

[28]Slingers and archers are attested fighting together from the Punic wars, Livy 37 41; 42 58 (also fighting with iaculatores); Sallust Jug. 46, 49, 94, 100, 105; L.Cornelius Sisenna Frag.19 1 (stationed behind the battle line); Caesar BG II 7 (Balearic slingers with Cretan and Numidian archers), BC passim; B.Afr. passim.

Idistaviso, the auxiliary infantry had to go to the help of the archers who were attacked by the Cherusci (Annals II 16).

Cavalry

At this point I intend to discuss the role of cavalry only with relevance to pitched battles. Their function in virtually every battle was to face the enemy cavalry on the wings, prevent or execute flank attacks, and to carry out the pursuit, as Onasander and Vegetius recommend (Onas.XVI, Veg.II 15). For the most part, cavalry seem to have avoided direct confrontations with infantry in battle line, for sound tactical reasons; cavalry are usually unable to break such formations, hence the line of infantry proposed by Arrian against the Alan cavalry, and the square infantry formation both Crassus and Antony employed with varying degrees of success against the Parthian cavalry. The superiority of even 'barbarian' infantry over cavalry is illustrated by Caesar's battle against the Nervii (BG II 20). The Roman forces were taken by surprise, and when his cavalry counter attacked they were twice repulsed by the Nervian infantry. Caesar's picked infantry at Pharsalus seem to have had little difficulty in forcing Pompey's cavalry to flee[29]. Once the cavalry had been driven off, it left the flanks of the infantry unprotected and vulnerable to attack by infantry, especially archers, as Caesar's fourth line at Pharsalus illustrates.

During the late Republic cavalry units frequently went into battle supported by light infantry, used to 'stiffen' cavalry in circumstances when the commander doubted the strength of his cavalry. This seems originally to have been a German method of fighting, and Caesar expresses his admiration for the

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[29]Frontinus considers Caesar's orders to his infantry to lunge at the faces of the cavalrymen a stratagem, though it is impossible to tell whether this increased the effectiveness of Caesar's infantry (Strat.IV vii 32).

fighters' abilities (BG I 48), although how the infantry and cavalry actually fought together is not explained. Since Caesar's cavalry was primarily Gallic and German, it is perhaps not surprising that he also interspersed his cavalry with infantry, either light armed auxiliaries or antesignani (see below p.158). However, the tactic seems to have been used more widely, by African and Spanish auxiliaries also. The African light troops are described as 'used to fighting alongside the cavalry'[30].

It has been suggested that this mixture of cavalry and infantry was the inspiration for the cohors equitata of the Empire (Keppie 1984 182). Because of the lack of detailed accounts of battles during the Empire, however, it is impossible to determine whether the cavalry and infantry of these units ever fought together in this fashion. Arrian's battle orders indicate not, for the infantry of his cohortes equitatae are arranged with the rest of the auxiliary infantry and the cavalry with the remainder of the cavalry on the wings[31]. The proportion of infantry to cavalry also suggests that this was not the case (Keppie 1984 182). The role of the infantry in this situation was to support and strengthen the cavalry but with 120 cavalry to 480 infantry in a cohors equitata, the cavalry would be vastly outnumbered. Unfortunately Caesar gives very few details on the proportions of light infantry to cavalry, though the numbers were probably about equal since in his description of the German fighters he indicates that there was one infantryman to each rider (BG I 48). The proportions for the Imperial cohors equitata therefore appear to be wrong for this type of fighting.

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[30]Cavalry and light infantry operating together: BG II 24; VII 65; VIII 17 & 19; BC I 43; II 34; III 75; III 84; very frequently in B.Afr., where it seems to have been the norm for light infantry to support the cavalry; B.Hisp.14, 21, 23, 30.

[31]Cavalry and infantry of cohortes equitatae were separated when on the march - Vespasian (BJ III 115-26) and Arrian (ektaxis 1).

The use of dismounted cavalrymen as infantry is not mentioned by the treatises and is usually condemned by writers both ancient and modern as tactically unsound (Livy 22 49; B.Hisp.15; Davies (1971) 756; Hyland (1990) 166), but there are examples of them operating as infantrymen under particular topographical circumstances, on ground unsuited to cavalry (Annals XII 31; Strat.II iii 23) and neither author mentions any disadvantage of cavalry fighting on foot, indeed they are very successful in both cases. It is questionable as to whether all cavalrymen suffered a disadvantage when fighting on foot as some at least trained and fought on foot before transferring to a cavalry unit (Veg.I 18; Gilliam (1965) 781; the example of Ti.Claudius Maximus, Speidel (1970) 143). Thus most cavalrymen would have at least some training and experience at fighting on foot, even though their equipment under such circumstances would not be designed for this. As Davies points out though, they would be more suitably equipped than the heavily armed legionaries under such circumstances (1971 756).

Antesignani

These troops have already been mentioned as the light armed legionaries Caesar used as well as auxiliaries to fight alongside the cavalry. The term literally means the men fighting in front of the standards, the front rank fighters who were first into battle and defended the standards (Strat.II iii 17), often the bravest men in the legion[32]. However, as Carter explains, "Caesar had begun to use them, or some of them, as a special body of troops to operate with cavalry or otherwise outside the normal legionary formation" (1990 191). Caesar only mentions numbers on one occasion (300, BC III 84) and does not indicate if this was the usual number but elsewhere it is

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[32]Cicero grudgingly admits Antony's bravery as an antesignanus at Pharsalus (Phil.II 71). Vegetius states that these men are the bravest in the legion, providing an example to others.

mentioned that Caesar customarily kept 300 men from each legion in light order (B.Afr.78). At this point the men are not called antesignani but they are sent to assist Caesar's cavalry, a role taken on other occasions by the antesignani (BC III 75), and they may well be these troops. Since the term antesignani refers to all the front rank fighters, presumably Caesar could use as many or as few as he needed for special duties. Caesar is the only civil war general reported as using antesignani and his use of them may have been unique.

Although Vegetius mentions antesignani (II 2, 7, 16), he gives very little information on their duties and role in battle, though he does say that they defended the standards and wore less armour, their helmets covered with bearskins (II 16). References to antesignani are extremely rare in the literature with no references other than the above and referring to the Imperial period. It is possible that with the expansion of the auxiliary forces in the early Empire and existence of light armed troops whose fighting abilities were not suspect, the principal role of Caesar's antesignani, as a small body of elite light armed troops, could now be given to the auxiliaries. Unfortunately the accounts of pitched battles in this period are too sketchy to provide any evidence on this matter.

Epigraphic evidence suggests there were troops still called antesignani during the Empire (Cagnat 1913 495 and AE 1978 471) and although Speidel is willing to argue that some ranks of the Imperial legion were armed and trained for different tasks, the evidence is slight and there is nothing to indicate that this was an Empire-wide situation and that all legions had a group of antesignani. Speidel argues for increased specialization within the legion from early in the Empire, perhaps even in the 1st century AD (1992 14-15) and uses Arrian's 'phalanx' as his principal example of this. Parker, however, goes

even further and suggests a radical change in troop deployment in the 2nd century and a return to a phalangic system (1928 258), which will be discussed below.

Artillery

Onasander does not mention the use of artillery in pitched battles, and Vegetius only mentions them as being positioned behind the battle line with the slingers, or on a hill to increase their range (III 14). For the most part, artillery plays the same role in a pitched battle as the slingers and archers mentioned above and like them could be stationed at the front or rear of the battle line, or on the wings[33].

Reserves

The system of the triplex acies provided groups of reserve cohorts at the rear of the battle line that could be used to reinforce a vulnerable point of the line (BG I 50; Pharsalus), deal with an attack from the rear (BG I 24) or carry out a flank attack (Pharsalus). Alternatively the auxiliaries or newly recruited legions could be kept as reserves (BG I 24; I 50; II 8), and in the Empire the entire legionary force was on occasion held in reserve (Hist.V 16; Mons Graupius). The account of Mons Graupius provides a good example of the use of reserves; the legions were held in the rear (Agric.35) and Agricola kept four alae for emergencies which he used to prevent a flank attack (cf: Onasander XXII). He may also have kept a further two cohorts in reserve, though Ogilvie and Richmond suggest this may have been because they were Britons and therefore not trustworthy (1967 274). There is no hint of the three groups of reserves mentioned by Vegetius (III 18).

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[33]At the front of the battle line, 2nd battle of Cremona (Hist.III 23); on the wings BG II 8, and both behind the infantry and on the wings, Arrian ektaxis 19.

Changes in the disposition of forces

Very few changes in field dispositions are recorded in the period from Polybius to Vegetius. The writers of military treatises agree with the historians of the Republic that the heavy infantry of the legions would form the centre of the battle line, with the auxiliary cavalry holding the wings and to pursue the fleeing enemy. Light infantry would be stationed in front of the legions to provoke the enemy into attacking, and then they would retire through intervals left between the cohorts of the legions. This was not the case in the late Republic and early Empire where the light infantry were usually stationed between the legions and cavalry, but the legions still carried the brunt of the fighting. However, two changes in the dispositions have attracted a great deal of interest; the use of auxiliaries as the main striking force instead of the legions and the possible reintroduction of the Hellenistic style phalanx. The reasons behind the former are disputed, as is the evidence for the latter.

Auxiliaries

There is no doubt that in some pitched battles of the Empire the auxiliaries took the role usually given to the legionaries and the latter were held in reserve. The principal examples of this tactic are Idistaviso (Annals II 16), the battle against the Frisii (Annals IV 73), Cerialis' defeat of the Batavians (Hist.V 17) and Mons Graupius (Agric.35-7). This method of disposition does not take over exclusively from the other Imperial system mentioned above; Suetonius' dispositions against Boudicca and Corbulo's against Tiridates are both of this type. At Mons Graupius, Tacitus claims the reason for Agricola's use of auxiliaries as the main striking force was to gain a victory without the loss of any Roman blood (Agric.35). Some modern historians have also taken this view to explain the different disposition:

> "It reflects the view that, at a time when there was still a clear division between the citizen legionaries and the non-citizen auxilia, it was desirable to preserve the lives of Roman citizens if possible." (Campbell 1987 29).

Hyland (1990 166) claims that Agricola used the auxiliaries at Mons Graupius as cannon fodder and that Caesar had the same attitude, frequently sending in cavalry prior to the infantry as shock tactics. This, however, does not appear to have been the case in pitched battles of the period; for the most part, as stated above, the cavalry fought the enemy cavalry and only attacked infantry in outflanking manoeuvres. There is a suggestion that Labienus was willing to use his auxiliaries in Africa as "cannon fodder", to wear down Caesar's troops simply by their numbers (B.Afr.19), but the fighting abilities of some of these troops was probably suspect; a lot of them had recently been levied from locals, freedmen and slaves, and under such circumstances, simply swamping Caesar's troops in this fashion seems a valid tactic. Agricola was most definitely not using his auxiliaries in this fashion; they were outnumbered by the British forces and the general had sufficient confidence in their fighting abilities not to send in the legions. Agricola would not have deployed his troops thus had he not been certain of a favourable outcome.

Tacitus gives no hint of this motive influencing the dispositions of Germanicus, Apronius or Cerialis, and Parker (1928 258) dismisses the reason for Agricola's tactics at Mons Graupius as "doubtless an invention of the historian". Both Parker and Cheesman (1914 104) state that if the enemy took up a defensive position on ground where the heavy armed legionaries could not operate successfully, the lighter armed auxiliaries would be sent in with the legions only engaging if the auxiliaries were driven back. The reason for this type of disposition is therefore tactical and due to the nature of the terrain. As stated above (pp.134-142), the occupation of favourable ground for fighting was of great importance to any general and it is a frequently repeated

theme in the accounts of the Gallic and Civil wars. Analysis of the topographical circumstances of the four battles involved proves interesting.

Idistaviso: The Germans were drawn up in front of woods whereas the Cherusci, who presented the stiffest resistance to the Romans occupied the hills. Furneaux (1896 306) suggests that the Cherusci "formed the key of the whole position, enabling them to fall on the flank of the Romans as they advanced". It was therefore important to deal with the Cherusci first.

L.Apronius: The Frisii made their stand on coastal marshes and the Romans had to approach across a ford. Apronius initially sent in German auxiliaries and cavalry, then other auxiliaries.

Cerialis: The first day Cerialis' legionaries had particular difficulty fighting the Batavians on marshy land adjacent to the Rhine. Civilis had also dammed the Rhine to flood the land further and Tacitus describes the terrain as "a slippery, treacherous waste of flooded land" and states that the legionaries were at a disadvantage "laden with arms and frightened of swimming" whereas the Germans knew the land and were familiar with this type of fighting. For the battle of the following day on the same terrain, Cerialis engaged with his cavalry and auxiliaries first.

Mons Graupius: The British army was occupying a defensive position on rising ground.

The four battles involved are all fought on what was for the Romans unfavourable ground, marshes or hills, but they were willing to accept battle under these circumstances because a pitched battle was the only way to defeat the enemy, particularly one with no cities or towns to be captured (Luttwak 1976 41 & 45). At Mons Graupius this was the first opportunity the Romans had to engage the retreating Britons in a pitched battle and Agricola could not

afford not to take it (Agric.30). There seems little doubt that Parker and Cheesman were correct in their assumption that the use of auxiliaries at Mons Graupius was for tactical reasons. The auxiliaries were traditionally the light armed troops of the Roman army and in these battles are being used in circumstances that would be difficult for heavily armed infantry (cf: Germanicus' campaigns in the lower Rhine, Annals I 64). Tacitus does state that there were some light armed auxiliaries at Mons Graupius (Agric.37, expeditas cohortes) and he may well be referring to the Batavians, though possibly to cohortes equitatae. Since these auxiliaries were famous for their ability to swim rivers in full armour (Hist.IV 12; ILS 2558), their armour is unlikely to have been particularly heavy.

The only detailed account of a pitched battle between mainly infantry forces after Mons Graupius is Issus, fought on level ground during the civil wars of the late 2nd century (Dio LXXV). The heavy infantry of the legions once again form the main battle lines with the light armed troops at the rear, firing missiles over the heads of the front ranks. Thus the use of auxiliaries as the main strike force in battles of the Imperial period appears to be for a specific tactical reason, employed under certain topographical conditions.

The legion as phalanx?

Arrian's Ἔκταξις κατ' Ἀλανῶν is the most detailed description of a Roman army on campaign since the accounts of Caesar and others in the late Republic. The author's dispositions in preparation for an Alan attack are particularly interesting and have given rise to much discussion, including the suggestion that in the 2nd century the legion deployed as a phalanx. Parker sees a "definite change in the tactical employment of Roman troops in battle" (1928 258) and states that "the legions were no longer drawn up in lines of

cohorts, but recourse was had to the older formation of the phalanx". Wheeler, who deals with the subject at length, sees hints of the phalanx in the 1st century AD and indeed suggests that the Romans never got completely away from the phalanx of the Servian constitution (Wheeler 1979 304).

Arrian's legionaries deployed in a formation 8 ranks deep with intervals of 1½ feet between each file, in contrast to the usual 3ft of the legion (Veg.III 15). The front four ranks were armed with the κοντος and the front rank aimed these at the bellies of the enemy horses. The next three ranks, whose κοντοι would have extended beyond the front rank as in a phalanx, also used their weapons for thrusting whilst the rear four ranks hurled their λογχαι at the enemy. Archers and artillery were stationed at the rear and fired over the heads of the legionaries; cavalry and auxiliary infantry held the wings, and more archers and artillery on the hills which Arrian used to fix his line provided more fire power.

Despite the initial surprise at these unorthodox battle plans, closer analysis suggests that they were not as radical as some historians have suggested. The positioning of the auxiliaries and cavalry on the wings is close enough to the standard deployment of the late Republic and early Empire, and the fire power behind the heavy infantry and on rising ground is both recommended by some treatises and visible in various pitched battles (see above p.135). It is the deployment of the legions, their weapons and Arrian's proposed tactics that appear new.

Wheeler cites many examples in his attempt to show the Republican forerunners of Arrian's disposition and equates the phalangic system with any tightly packed defensive formation (1979 307) such as the testudo. The testudo is

described in detail by Dio (XLIX 30) who states that one of the formation's two uses was to protect a body of soldiers surrounded by archers. Onasander recommends the use of this formation for the same purpose, to protect a battle line which lacked light armed troops (XXI). The testudo therefore appears simply to be a defensive formation against an enemy well equipped with missiles and does not indicate a phalangic tendency of the Roman legions.

I see no indication of a legionary phalanx in operation during the 1st century AD either, although some have suggested this formation for Suetonius Paulinus' dispositions against Boudicca (Parker 1928 258) and Agricola's at Mons Graupius (Parker 1928 258; Wheeler 1979 310-11). Paulinus does indeed draw up his army in a confined space, as does Arrian, but this was a standard procedure to prevent a flank attack, and there is nothing in the accounts of the battle to suggest the legions had deployed as a phalanx. At Mons Graupius the legions were held in reserve. The positioning of the legions to protect the camp as well as provide the reserve force is a procedure well documented in military histories (Polybius III 117; BG I 50; II 8). Wheeler argues that the vocabulary of Tacitus' account corresponds with some of Arrian's commands and he sees this as the immediate precursor of Arrian's phalanx (1979 310-13), suggesting that the next step would be removing "the veil of auxiliary infantry seen at Mons Graupius". However, the auxiliaries at this battle numbered 8000 and cannot really be described as a "veil". The legions are held in reserve while the auxiliaries form the main battle line for the tactical reasons mentioned above and again, there is no suggestion that the legions are being deployed as a phalanx.

Arrian's proposed dispositions are also for tactical reasons. As Wheeler notes, "the Romans modified their formations and tactics according to circumstances,

opponents and terrain." (1979 304). Thus Agricola used auxiliaries because of the terrain; Arrian proposed his formation for use against the Alan heavy cavalry. It is based on the theory that cavalry will not charge a battle line bristling with spears. It is essentially a defensive formation, but Arrian's whole campaign was a defensive one and he planned to avoid an engagement if possible. According to Dio, he succeeded in this, scaring off the Alans (LXIX 15).

Although Parker suggests a radical alteration to legionary organization to accommodate the phalanx there is plenty of evidence to disprove this. The epigraphic evidence shows the continued existence of the cohort structure well into the 3rd century (see chapter 3 on The Organization of Units). Wheeler argues that Arrian's system could be based on the contubernium, with half the eight man contubernium armed with the κοντος and the other half with the λογχη to produce a single file of the phalanx (1977 270; 1979 312-13).

The question of how the legions were armed in the phalanx formation has been considered by Wheeler in detail (1977) and more recently, though in less detail, by Speidel (1992 15). Wheeler attempted to identify the two different spears used by Arrian's legions, but only from comparative literary evidence; there is no analysis of the archaeological or epigraphic evidence. Speidel attempted to use the latter and although there is some evidence for increased specialization and specialist units in the late Empire, there is very little evidence for this in the 2nd century, particularly within the legion (see above p.159). There was experimentation in the design of weapons in the Roman army, particularly with spears (Plut.Marius 25; Suet.Dom. 10; on the wide variety of spear types, Marchant 1990) and it is difficult to tell precisely which types were used by Arrian's troops. What is certain is that they were

not using the Macedonian sarissa, and it seems likely that the spears were a standard type adopted or adapted for this purpose.

The use of the term "phalanx" to describe this formation is, I believe, a misnomer. Arrian uses the term to mean legion and this may have led some historians to suggest more extensive use of the phalanx (eg: Parker 1928 258 n.3). Historians have also attempted to find later evidence for the use of the phalanx (eg: Wheeler 1979 314ff). Alexander Severus' 30,000 men recruited for his Parthian war have been used in this context as the Historia Augusta refers to it as a phalanx (Sev.Alex. 50 5) but the SHA points out that the phalanx was formed of six legions armed like the other troops. This sounds rather like Nero's Legion I Italica, the "Phalanx of Alexander" (Suet.Nero 19), recruited for a possible Parthian campaign, and there has never been any suggestion that this was armed and deployed as a phalanx.

Various historians point out that the "phalangic" formation was used more frequently in the later Empire and Wheeler cites examples of the Romans using the συνασπισμος or testudo formation, but this is frequently used as a defensive formation as it was by Crassus and Antony in the late Republic, or as a deployment against heavy cavalry, the type of enemy Rome had to deal with more frequently in the late Empire.

Because the ἔκταξις is the only detailed account of field dispositions between Caesar and Ammianus there is the danger that too much emphasis might be placed on the differences between this battle line and the standard deployments of earlier periods. Arrian was planning a defensive campaign against an enemy armed in a different way to Rome's usual enemies in the early Empire. Wheeler (1979 304) cites Marsden as suggesting that this is one of the

stock battle plans of the 2nd and 3rd centuries (1969 190) but Marsden is referring to the positioning of artillery on the flanks and wings, not to the tactics of the legion. The dispositions Arrian used may also have been used elsewhere, but they were by no means the only type. Like Agricola's deployment at Mons Graupius and others in the 1st century, Arrian's dispositions are for tactical reasons, because of the nature of the campaign and the enemy. For the most part, Arrian's dispositions correspond with the treatises and field practices of the Republic and early Empire (legions in centre, auxiliaries and cavalry on the wings; fire power on rising ground and behind the battle line). Frontinus would probably have described it as a stratagem like Antony's use of the testudo (Strat.II iii 15) rather than a major change in legionary deployment.

Pursuit

The importance of the pursuit following a pitched battle is indicated by the prominence the subject is given by the treatise writers. As stated above (p.144), both Onasander and Vegetius suggest the use of light troops to carry out the pursuit of a fleeing enemy (Onas.XIX; Veg.II 15, III 14). Both also stress the particular importance of keeping the battle line in formation (Onas.XXVII, XXXII; Veg.III 14). Vegetius states that the line of battle is solely designed to repulse or, if possible, break the enemy (III 17). Onasander states that retreats and pursuits should be made in formation, to reduce casualties in the former case and to inflict greater injury on the defeated in the latter (and to be ready again in case the enemy turn, XXVII). Vegetius suggests that the defeated enemy should not be completely surrounded but allowed to flee so they would not turn and fight (III 21). Retreats should be made with great care not to demoralize the army and not to

fall into ambushes, but to delay the pursuing force with ambushes oneself (III 22).

Pursuit is invariably carried out by the cavalry, sometimes accompanied by the light infantry (eg: Arrian). The heaviest casualties in a pitched battle almost always occur to a fleeing enemy whose battle line has been broken, a fact acknowledged by Caesar who was unable to take full advantage of defeating the British because he lacked the cavalry for the pursuit (BG IV 26, 35). The literary sources frequently refer to the heavy casualties caused by pursuing cavalry (Plut.Lucul.28; BG I 50; II 20; VI 8; BC II 40; Idistaviso; Mons Graupius). Arrian proposed that his pursuit of the Alani should be carried out by the cavalry and light infantry, but the heavy infantry, his "phalanx", was to remain in formation and advance slowly behind the pursuers in case the enemy should turn and renew the attack (ektaxis 29), which is exactly what Onasander recommends. This advice also corresponds with that of Vegetius on the purpose of the line of battle cited above; the assumption is that once this line is broken the killing of the defeated by the cavalry will finish the battle off and destroy the fleeing army.

Casualty figures would appear to back up this general strategy; accounts of battles do not always mention the casualty figures, and when they are mentioned they may be exaggerated for political or literary reasons. Although the figures are probably fairly unreliable, the proportions of casualties on the two sides give some indication of the often very unequal losses, eg: Thapsus, 5000 to Caesar's 50; Munda, 30,000 to c.1000; Boudicca, 80,000 Britons to 400 Romans; Mons Graupius, 10,000 Britons to 360[34].

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[34]The casualty figures for the Roman campaign against Antiochus are even more disproportionate; Appian gives the figures for two battles; XI 20, Roman losses 200 to Antiochus' c.10,000 including prisoners; Magnesia XI 36, Roman

Roman retreats during the late Republic and early Empire are usually made in formation, such as the testudo used by Crassus and Antony in Parthia and the circular formation Domitius' troops deployed to gain the high ground after their defeat by Pharnaces. But the principal reason for the construction of a marching camp near the battle site was to provide a defensible position to which defeated troops could retreat (eg: Cannae, Livy XXII 49; 2nd battle of Cremona, Hist.III 26ff). The importance of marching camps as a place of refuge is shown in Caesar's commentaries; he invariably constructed a camp before he offered battle (BG I 43; II 8; BC III 94-5), and on one occasion battle was avoided because of the marching camps of both sides (BC I 82). Caesar and Afranius had constructed camps less than two miles apart on the battlefield. Caesar wished to avoid battle because "the proximity of the camp would allow the beaten side to retreat and find refuge quickly", and a result would not be forthcoming.

One of the more interesting recommendations Vegetius makes is that the defeated enemy be allowed to flee so they would not turn and fight (III 21). Arrian's plans for the pursuit seem to have the same idea and he certainly had no intention of surrounding the enemy. Frontinus devotes a section of his Stratagems to this topic on the grounds that if the enemy was totally surrounded he was more likely to fight to the death; this would result in greater casualties to the eventual victor. Frontinus includes Hannibal at Lake Trasimene and Caesar against the Germans as examples of allowing the enemy to escape to inflict greater casualties during the flight (Strat.II vi 4-5).

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losses of 24 cavalry and 300 infantry to c.50,000 including prisoners.

The General

Although Onasander tends to give more prominence to the position of the general, both he and Vegetius state that the general should fight a battle from the rear (Onas.XXXIII; Veg.III 18); in Vegetius he should be at the rear, to the right of the infantry with reserves; in Onasander he is kept at the rear to stay alive and keep command of the troops. He is expected to ride by and encourage his men by his presence and move troops around the field when necessary.

Emphasis is placed on the general staying alive. An army could be thoroughly demoralized by learning in the middle of a battle that their general had been killed, and even if he was just wounded the news could have an affect on the outcome of the battle. In a battle between Antony and Pansa the latter was wounded and as soon as his army heard of this they turned and fled (Appian BC III 69). Frontinus includes an example of an army losing confidence after learning that their general had been injured (Strat.II vii 11), and of how misinformation could be used, spreading the rumour amongst enemy ranks that their general had been killed (Strat.II iv 9-10)[35]. Caesar was particularly aware of the importance of encouraging his troops in this respect; at Alesia he wore a distinctive red cloak which must have given the soldiers heart whenever they caught sight of it (BG VII 88) and at Munda he took off his helmet to assure his soldiers that he was still alive (Appian BC II 104).

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[35]Another example of the use of misinformation may have occurred at the second battle at Cremona; Tacitus hints that Antonius Primus may have deliberately spread the rumour that Mucianus' troops had arrived (Hist.III 25).

Despite advice to the contrary from the treatises, the general frequently took to the field with his troops; both Caesar and Sulla did so to shame their men into renewing the fight (Strat.II viii 12-13)[36]. According to Tacitus Agricola fought on foot with the auxiliaries at Mons Graupius but this would have made it very hard for him to see the overall situation and decide when to send in the reserve cavalry.

This illustrates another disadvantage of the general fighting as a foot soldier rather than directing the battle from the rear, that it left to someone else the responsibility of sending in the reserves. In his battle against Civilis, Cerialis remained at the rear with a reserve force of picked men for emergencies (Hist.V 16) which is exactly what Vegetius recommended. Caesar, on the other hand, fought with the right wing against Ariovistus and although his presence there greatly encouraged the legionaries, it meant that Crassus, the cavalry commander, had to order in the third line of the triplex acies to support the hard pressed left. The other officers were occupied in the line of battle and had Crassus not noticed the difficulties of the Roman left, or been engaged with the cavalry elsewhere, the battle might not have been such an overwhelming victory for the Romans.

Apart from staying alive, one of the other principal duties of the general in battle was to encourage his men, which Onasander mentions. Traditionally generals spoke to their troops before a battle to encourage them and this gave the historians an opportunity to exhibit their rhetorical skills as they rewrote or composed these speeches for their histories. Indeed, these speeches are

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[36]It was not just generals who made use of this tactic to encourage their men to fight eg: the famous standard bearer of the Xth at Caesar's opposed landing in Britain (BG IV 25) and Frontinus Strat.II viii 1-6, variations on the same tactic.

often as important to the historian as the actual battle (see above p.133 note 3). Obviously if the general was fighting as a foot soldier he could not ride up and down the lines of troops encouraging them as Onasander suggests, although of course he would be a great encouragement to the soldiers he was actually fighting with. On one occasion Caesar did do what Onasander suggests, when his army was caught offguard by the Nervii when entrenching (BG II 20). The tactical situation was fairly serious and so Caesar rode round the different groups making speeches to encourage them. He then joined the weakest part of the line on foot.

Conclusions

The accounts of pitched battles in the Roman period for the most part correspond favourably with the recommendations and suggestions put forward by the treatises. Choice of terrain, disposition of forces, positioning of reserves etc. very often reflect the contents of the treatises, and concerns are the same, particularly regarding terrain and being outflanked. There are inevitable variants and occasions when what the treatises suggest does not reflect actual practices, but as Onasander points out, some things cannot be reduced to rules or planned beforehand.

Onasander is much less rigid about military procedures than Vegetius. The earlier writer is content to leave the general to make many of the decisions, particularly concerning the details of dispositions. Vegetius, on the other hand, supplies his recommended 'standard' battle line, plus a number of variants depending on topographical circumstances and the nature of the troops on both sides. The later writer is also far more cautious than Onasander and Frontinus. All advise care when engaging, and Onasander suggests avoiding battle until a suitable place is found, but only Vegetius

recommends avoiding battle completely and only fighting when absolutely necessary or when the outcome was in no doubt (III 25).

Failure to engage an army would mean keeping an army intact and this is more in line with the low risk defence of the later Empire (Luttwak 1976 192-3) than the more risky offensive strategies of the earlier period. It is perhaps not surprising after the Roman defeat at Adrianople. As in his book on siege warfare, Vegetius is more concerned with defence than attack. Arrian's campaign against the Alans is essentially defensive, the author intending to engage the enemy only if necessary and under specific topographical circumstances. In a defensive campaign, such considerations are of equal importance to the actual deployments, especially since the evidence of Vegetius suggests that the latter had not changed a great deal since the Republic.

Although the treatises and actual field practices correspond very well on the subject of pitched battles, it is impossible to tell whether the treatises had any influence at all on battlefield procedures. Roman battle tactics were very conservative; Caesar indicates that there were established military practices and dispositions in the Roman army (BG VI 34), and the treatise writers would of course have been aware of them. Caesar certainly was aware of the contents of the text books and indeed implies that they had some relevance to actual practices, although perhaps there is a slight criticism of them for being too rigid (BG II 22), something which Onasander seems to have attempted to avoid (XXXII)[37].

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[37]Caesar states that his dispositions against the Nervii were dictated more by the features of the site, the slope of the hill, and the demands of the immediate situation than by the theories of any military rule book (BG II 22).

Siege Warfare

Introduction

Siege warfare played an important part in Rome's external and internal conflicts. The capture of towns and strongholds in enemy territory was often one of the principal objectives of an invading force; towns and strongholds could have great strategic importance; wealth could be obtained through the plunder of captured cities, and it could be the only way to attack an opponent who declined to accept a pitched battle[1].

The importance of siege warfare is indicated by the prominence it is given by both the treatises and other sources. Roman historians tended to give sieges prominence, partly no doubt because of their importance, but also because of the dramatic episodes they frequently involved. The treatises, however, tend to deal primarily, and often exclusively, with the construction of siege machinery rather than methods of attack and defence, and since this thesis is concerned with the practicalities of warfare and not military engineering which has already been considered in detail (Marsden 1969 & 1971), such machinery will only be considered when sufficient information is available in the treatises concerning their use.

This chapter will therefore consider the advice of the treatises and the evidence available in historical and archaeological sources concerning the practicalities of siege warfare and the employment of the engines described in the more technical treatises. It will also survey briefly the precursors of Roman siege methods and discuss any changes that took place during the

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[1]The Jews seem to have realized they could not defeat the Romans in pitched battle so decided to defend selected strong points during the Jewish revolt.

Republic and Empire. A precis of Roman sieges discussed in the chapter is contained in Appendix 3; references to siege sites followed by a date in brackets indicates an entry in the appendix.

The Treatises

A number of the surviving treatises touch on the subject of siege warfare. Some of these are concerned almost exclusively with the subject and tend to be fairly technical, covering artillery and other military machinery whereas other more general treatises usually include sections of varying detail on the subject. The writers of both types seem to have made some use of earlier Greek and Hellenistic works[2].

The two surviving Greek treatises on this subject are by Aeneas 'Tacticus' and Philo of Byzantium. That of Aeneas dates to the 4th century BC and is concerned only with methods of defence, though as stated above (Chapter 2, on the Literary Sources), originally there was probably a companion treatise on how to besiege a city[3]. The exact date of Philo's work is disputed, though it is generally agreed that it dates to the Hellenistic period[4]. The treatise covers both sides of siege warfare, giving detailed instructions on how to fortify, provision and defend a city, and how to besiege one.

As stated above, the treatises of the Roman period may be divided into two types, and the specific advice given by these will be discussed in the relevant

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[2]It is because of the influence of earlier Greek and Hellenistic works on the Roman treatises that this chapter will include a discussion of earlier siege techniques.

[3]Lydus cites Aeneas as an authority on the art of besieging a city (πολιορκετικα) rather than on defending one (de Mag.I 47).

[4]Lawrence (1979 69-71) summarizes the arguments; he suggests a date in the 240s BC but a later 3rd century date is also proposed.

sections below. Of the more general writers, Onasander rarely touches on the practical side of siege warfare and is more interested in the moral issues involved such as the treatment of captured towns and their defenders (see below, Chapter 8 on Morality in Warfare). Frontinus covers the subject in Book III of the Strategemata, but believed that the development of machines and engines for siege warfare had long since reached their limit (Strat.III Pref.), and so does not include them in his work. Instead he concentrates on ruses which he considers useful for the capture and defence of cities.

Vegetius devotes a large section of his de Re Militari to siege warfare, treating it in the same way that Philo does, from the point of view of both attacker and defender, though with a pronounced emphasis on defence. Vegetius' section on siege warfare was, by his own admission, based partly on earlier sources (IV 30)[5]. The book may be divided up into a number of sections on different subjects, and it is possible to see how indebted he was to earlier works:

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[5]"I believe I have arranged for convenient public use the information on besieging and defending cities that ancient authors have handed down, and that has been discovered more recently through necessity."

Veg.IV 1-6	How cities may be defended naturally and by fortifications.	Philo I Vit. de Arch I v On fortifications of cities. Vegetius may have followed Vitruvius to some extent (Johnson 1983 31) but would appear to be more indebted to Philo[6].
Veg.IV 7-11	The supplies a city should gather in case of siege.	Philo II
Veg.IV 13-25 eg: Veg.IV 18-19	Combination of Philo's individual sections on withstanding a siege and besieging a city. On heightening walls and firing incendiary devices to counter advance of siege towers.	Philo III, on withstanding a siege. Philo IV, on besieging a city. Philo III 12-13.
Veg.IV 23	Semicircular concave wall to cover breach in outer wall	Philo III 18.
Veg.IV 28	Brief mention of circumvallation	Philo III 5-6.

Vegetius makes no mention of Philo in his list of sources (I 8); they are all Roman. However, since Roman siege techniques were closely derived from those of the Greek and Hellenistic periods, it seems likely that the Romans would have used Hellenistic treatises or based their own very heavily on earlier works. Thus Vegetius might be using a Greek source such as Philo or, perhaps more likely, a Roman treatise which was itself a direct descendant of the Greek and Hellenistic tradition.

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[6]Vegetius is often not as detailed as Philo; for example, although he points out that right angled towers are vulnerable to rams (IV 2) he does not prescribe any particular shape for towers as Philo does (II 2-6).

Vitruvius touches on certain aspects of siege warfare in his capacity as a military architect. When describing the construction of a town's fortifications, he takes into consideration the possibility of a siege and his walls, towers and gates are designed with this in mind (de Arch.I v). Book X includes fairly detailed descriptions of artillery and other assault machines such as rams and siege towers, along with other machinery such as lifting devices (X ii), mill wheels (X v) and water screws (X vi). Vitruvius, however, feels it unnecessary to say much about the defence of cities "because the enemy do not make use of our manuals when they besiege a city" (de Arch.X xvi 2)[7].

The three surviving treatises of the Roman period that are more technical in nature were written by Greeks, and in some cases the authors make considerable use of their Hellenistic predecessors. The περι μηχανημάτων of Athenaeus 'Mechanicus' and artillery treatises by Heron of Alexandria have been discussed above and will not be considered further (see Chapter 2 on The Literary Sources). The latest of the Greek technical treatises is that by Apollodorus of Damascus, written at the request of the Emperor Hadrian. On the whole, Apollodorus' work is less technical than the artillery manuals and in his opening note to the Emperor he claims to have made no use of ancient authors because they were out of date. The treatise describes a variety of equipment needed in assaulting a stronghold and is generally more practical than Vitruvius' work on the subject. Whereas the latter simply describes the

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[7]A very interesting comment suggesting that manuals on siege warfare were available in Vitruvius' day and could have a practical application. The author does not consider the possibility of Romans besieging Romans as had happened in the recent civil wars. Perhaps Vitruvius, a supporter of Caesar and Octavian, felt that this was unlikely now the latter had secured himself in power.

different pieces of equipment, Apollodorus gives at least some information on how they should be used and can be adapted for different purposes[8].

Pre-Roman Siege Warfare

A gradual evolution in siege techniques may be seen from the Assyrian period onwards, and the evidence for most of these periods is for the most part extremely good. Assyrian and other early sieges are described in literary records and are graphically illustrated in the 9th century BC palace reliefs from Nimrud and elsewhere in Assyria[9]. The reliefs show besiegers using siege ramps, mobile siege towers, scaling ladders, rams, and possibly mines whereas defenders are depicted firing or throwing missiles from city walls and employing an anti-ram device, catching it with chains and upending it. Both sides used archery and incendiary devices. The Assyrians also blockaded cities, setting up a fortified camp outside the city walls and starving the besieged into surrender[10].

Persian siege techniques are illustrated at Palaepaphos; Paphos had participated in the Ionian revolt and the Persians besieged it in c.497 BC, destroying a sanctuary outside the city for materials for a siege ramp. Missiles found around the ramp probably represent attempts to halt its

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[8]eg: Apollodorus includes a section on the different uses of ladders whereas Vitruvius does not think it necessary to give any information on them (de Arch.X xiv 1).

[9]Saggs (1944) 260-261 quotes from a description by the Assyrian king Esarhaddon of a siege he carried out; sieges are also mentioned in the Old Testament eg: Deuteronomy 28 52; Joshua 2-6 on the capture of Jericho including the sending out of spies and massacre of the population and destruction of the city.

[10]cf: Oppenheim (1955) who quotes documents mentioning children being sold for money in order to buy food. Another document mentions a woman in Babylon who sold herself into slavery to receive food from her master and so survive a famine while the city was besieged.

construction, and the besieged also undermined the ramp and fired it, causing part of it to collapse. The Persians may have entered the city following a violent assault on one of the gates, but this is not certain.

Plataea provides a good example of a major development in siege warfare. The city was besieged in c.427 BC by the Peloponnesian army which tried a number of different techniques, including building a ramp and direct assault; the Plataeans heightened their walls and undermined the ramp. When direct assault failed, the Peloponnesians built a line of circumvallation with a ditch and two brick walls which were roofed to provide shelter for the garrison; towers were set at regular intervals. This is the earliest reference to such an investing work (Thucydides XI 8ff), though its sophistication suggests it may not have been the first physical line of blockade.

Torsion artillery, supposedly invented for Dionysius I in the early 4th century BC (Diodorus Siculus XIV 42 1), came to be used widely in sieges for both offence and defence, particularly as an anti-personnel device; its use in providing covering fire for Alexander's troops at Halicarnassus seems to have been a major factor in the success of the assault (Arrian Anab.I 20-23). In the late 4th century BC siege warfare seems to have become a very large scale affair with the use of massive artillery and huge mobile siege towers. The best example of this was the helepolis, built for Demetrius Poliorcetes' sieges at Salamis in Cyprus and Rhodes and which Diodorus describes in detail (XX 48; 91). Unfortunately Demetrius had little success with his towers; the one at Salamis was burnt and he was unable to bring that at Rhodes into action properly, so their effectiveness cannot be judged.

The essential techniques of siege warfare changed little from the Assyrian period through to the Middle Ages and, as stated above, the Romans were able to benefit from the developments that had taken place before them, and from the Greek and Hellenistic textbooks that were available.

Roman Siege Techniques

As stated above, none of the textbooks actually describes how to carry out a siege from start to finish, not even Vegetius. Instead they tend to concentrate on machinery, as Vitruvius and Apollodorus do, or on particular ruses that can be used to capture a city, and defences against them (Onasander and Frontinus). It is, however, possible to obtain some advice, albeit sometimes very brief, about most aspects of attacking and defending cities and strongholds.

There were two ways of attacking a fortified position; by direct assault or by blockade. These tactics could be used individually or together; a violent assault could be sufficient to capture the objective (eg: New Carthage (210 BC); two oppida in Britain (54 BC); Volandum (AD 58)), whereas if the general did not wish to risk this, the stronghold could be blockaded to induce surrender through starvation (eg: Numantia (133 BC); Alesia (52 BC); Uxellodunum (51 BC)). Alternatively, the stronghold could be immediately blockaded whilst preparations were made for an assault (eg: Ambracia (189 BC); Pindenissum (51/50 BC); Masada (AD 72/73)). The most common method, however, was to attempt an initial assault and, if this failed, to blockade the stronghold whilst preparations were made for an assault with siege machinery (eg: Syracuse (214-12 BC); Carthage (147-6 BC); Marseilles (49 BC); Jotapata (AD 67)).

Initial Assaults

Onasander's advice is concerned more with the violent assault of cities than with blockades; he suggests that the general should make a sudden assault to give the defenders less time to react (Onas. xxxix), dividing his army to weaken the besieged by continuous attacks at different parts of the walls, and he also advocates the use of feint attacks to divide and confuse the defenders (xlii). Frontinus illustrates the advantage of surprise attacks (Strat.III i), and attacks from an unexpected quarter (III ix), and Vegetius warns that this initial assault is frequently the most dangerous for defenders because of its violence and the determination of the attackers (IV 12).

Corbulo's attack on the Armenian city of Volandum (AD 58) provides an excellent example of the type of violent assault recommended by Onasander. Having made a reconnaissance, Corbulo divided his force; whilst half provided a highly effective covering fire from artillery and slings, the other half attempted to undermine the walls under the protection of a testudo formation, and to scale them with ladders. The defenders were overcome by the violence of the assault, and Corbulo took the city in a few hours with no casualties. Scipio's attack with two divisions simultaneously at New Carthage was initially unsuccessful, but he made another immediately, with one group attacking from a lagoon at low tide. The defenders were taken by surprise and caught between the two forces (210 BC), again illustrating the effectiveness of a surprise attack.

Although Onasander (xlii), Frontinus (Strat. III ix 3) and Vegetius (IV 26) all recommend or warn the defenders about the use of stealth to capture citadels or very well defended points, this rarely happened. Frontinus provides only one example, from the Jugurthine war (Strat.III ix 3; Sallust

Jug.93-4)[11]. Another way to encourage a citadel to surrender seems to have been to sack the captured part of the city until any defenders holding out in the citadel surrendered (this will be discussed in greater detail below, Chapter 8).

Advice on countering an assault of this type is very limited. Vegetius suggested building up supplies of missiles (IV 8 & 29) in preparation for a siege, and these could be used against an initial assault. Although he mentions that this was a particularly dangerous time for the defenders, he fails to give any advice on what they might do.

Roman fortifications coming under such an assault were also defended by soldiers with pila muralia, a particular type of spear. These were used by Cicero's soldiers when his winter camp came under attack (54 BC; BG V 40) and when Sabinus' troops were defending the Roman circumvallation during a sortie by the defenders of a Thracian hillfort (AD 26; Annals iv 51). Pila muralia may also have been represented on Trajan's Column (scenes 77-79); Roman soldiers are shown defending a stone fort and thrusting at the Dacian attackers, presumably with some kind of spear. The shafts of ordinary pila would probably not have been strong enough to withstand such treatment and pila muralia would have required thick, heavy shafts so they could be dropped or thrust down on attackers with greater force[12]. Connolly has suggested that a spear illustrated on the Praeneste ship relief in the Vatican is a pilum murale because of the thickness of the shaft.

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[11]Although the Gauls attempted the same with the Capitol in 390 BC, they failed because of some vigilant geese and Manlius (Livy v 47).

[12]These were not the palisade stakes, mistakenly called pila muralia, examples of which have been found at the sites of Roman forts (see above, Chapter 4 on Marching Camps).

Assault Machines

If the initial assault failed, or one was not attempted, the besieging general was expected to prepare various machines and shelters for attack, often building a circumvallation as well to protect his troops and enforce a blockade (see below p.183, 199 ff). Apollodorus and Vegetius both describe some of these devices, the former in more detail, whilst only the latter explains how to counter them. Onasander avoids the subject altogether, stating that it is not his duty to tell the general to use a particular piece of equipment under certain conditions (xlii); a general will use the different types of siege engines as the opportunity arises, and his decision will be based on luck, the strength of the defenders and the skill of the military engineers present[13]. This statement perhaps helps to explain why the treatises do not prescribe how to carry out a siege in the way they do with other aspects of warfare (see below p.205).

Shelters

Shelters (vineae, pluteii, crates and testudines) provided protection for the attackers to approach the walls for assaults or mining purposes, and the different types are described by Apollodorus (140.9-144.2; 153.8-155.7) and Vegetius (IV 13-16). The shelters were generally made from a framework of stout timbers with planks and wicker hurdles on the sides and roof as protection against missiles. The whole structure would then be covered with uncured hides or some other fireproof material to protect it from incendiary devices (Apollodorus 142; Veg.IV 15).

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[13]Vitruvius (de Arch.X xvi 1) also makes this last point, a fact apparently confirmed by Josephus' statement that the artillery of Legion X at Jerusalem was superior to that of any other legion (BJ V 269). Perhaps this legion had better engineers than the others.

Shelters of all these types were regularly used in sieges (eg: Noviodunum 57 BC, Avaricum 52 BC, Pindenissum 51/50 BC, Marseilles 49 BC, Vetera AD 69, Amida AD 359) but although Vegetius suggests different uses for the different types of shelter (the testudo for the ram, vineae for sappers, pluteii for archers etc.), the other literary sources do not seem to make these distinctions; Caesar, for example, seems to use the term vineae for shelters of all types. Vegetius does not suggest any specific defences against these shelters, though he does later against the ram testudo (IV 23) and presumably the missiles he recommends at this point, and incendiary devices, would be equally effective or ineffective against other types of shelter. At Marseilles, for example, the attackers were working behind vineae made of four layers of hurdles because of the power of the defenders' artillery, and even these were pierced. Such was the strength of the artillery in Marseilles that eventually Caesar's troops were forced to build a gallery from brick and timber to allow them to approach the walls. These shelters were to allow the attacking troops access to the walls for attempted assaults, the use of a battering ram, or undermining operations.

Siege towers

The construction of siege towers is covered by Apollodorus in some detail (164.5-178), and by Vegetius more briefly (IV 17), whilst both Josephus (BJ V 291 ff) and Ammianus (xix 7; xxiv 2) describe such towers in use[14]. Siege towers had to be well protected by uncured hides against missiles and incendiary devices and were generally supposed to include rams and boarding bridges along with artillery and archers to keep the defenders off the walls whilst the tower was brought into action.

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[14]Ammianus (xxiii 4 10-13) also describes a siege tower as part of his excursus on siege machinery. However, since this considers only the construction of the tower and not its use, it will not be included here.

Descriptions of siege towers are often more detailed in the historical sources than the treatises, and it is in these sources that evidence for the practical use of towers can be found (eg: Cirta 116 BC; Avaricum 52 BC; the sieges during the Jewish revolt; Amida AD 359; Pirisabora AD 363). One is also illustrated in action on the Arch of Severus in Rome (Panel iv)[15]; the tower here contained a ram on one of the lower levels and troops on the top levels waiting to storm the city whilst others hurl missiles to keep the defenders off the walls. The siege tower at Masada also contained a ram, though on a higher level, and Josephus comments on its effectiveness against the stone wall of the fortress. This tower, like those at Jotapata (AD 67) and Amida (AD 359) are described as being protected from incendiary missiles by hides as advised by the treatises, whilst Ammianus makes no mention of the towers on wooden rafts at Aquileia (AD 361) having any kind of protection, and they were burnt by incendiary devices fired by the defenders.

Vegetius suggests several defences against the advance of siege engines (IV 18-20); sorties could be made, sections of the wall could be strengthened or heightened to prevent siege towers dominating the walls, mines could be dug where the tower would approach so it would subside before it reached the walls, and when a tower was moved up, the defenders could attempt to drive it away from the walls using long iron-bound beams.

Onasander warns the besieging general about the dangers of sorties (xl) and they are reported during a large number of sieges, meeting with varying degrees of success; at Athens (87 BC) the defenders were able to burn the siege engines, and at Marseilles (49 BC) the defenders sortied during a truce

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[15]The contents of the friezes on the Arch of Severus are discussed by Brilliant (1967).

to burn the Caesarian siege works. At Amida (AD 359), however, the defenders got into difficulties during over-optimistic sorties and eventually the gates of the city were blocked up to prevent sorties rather than to provide additional security for the besieged city.

There is plenty of evidence to suggest the strengthening and heightening of walls in preparation for an attack, or during a siege, was a fairly common practice. At Dura (AD 256) long mounds were built by the defenders inside the walls to strengthen them against attack from rams and outside presumably for added protection and to hinder the approach of siege towers. Archaeological evidence suggests the walls of Veii were strengthened at some point before the siege there (396 BC), possibly because of the prospect of a siege, and those of Syracuse (214-212 BC), Placentia (AD 69) and Cremna (AD 278) were also strengthened at some point soon before they came under siege. These were preparations made either with the possibility of a siege in mind or before a siege had actually begun. At Avaricum (52 BC) and Jotapata (AD 67), Dura (AD 256) and Amida (AD 359) sections of the wall were heightened when they came under threat from the attackers' siege operations, in reaction to the attackers' actions rather than in preparation for them, and at Haliartus (171 BC) the defenders rebuilt the wall with rubble as the attackers demolished it.

The undermining of siege ramps seems to have been a common practice in this type of warfare since early times (eg: Palaepaphos, see above p.181), and was frequently done to prevent the approach of siege towers (eg: Sotiates 56 BC and Avaricum 52 BC, both without success; Jerusalem (AD 70) and Dura (AD 256), successfully). Vegetius, however, never mentions the use of siege ramps, and the example he gives of undermining a siege tower is from Rhodes

in the 4th century BC, perhaps another indicator that he was using a Greek treatise for this section of his work or, as suggested above, a Roman treatise that was itself based heavily on a Greek work.

It was possible to drive away siege towers with long beams as Vegetius suggests, and the Romans did this at Vetera (AD 69) to counter the advance of a two storey siege tower built by the Batavians. The tower was demolished by blows from the poles.

Battering Rams

The ram is one of the few items of siege equipment which can be properly discussed from the point of view of both offence and defence and with reference to the advice of the treatises and actual field practice. The ram (aries) would usually be suspended in a mobile shelter or tortoise (testudo) for protection and ease of movement, and according to Vegetius both the ram and the shelter got their names from their similarities to the two animals (IV 14). The ram is described in detail by Vitruvius (de Arch X xv) and Apollodorus (153.8-164.4), briefly by Vegetius (IV 14), and in the histories of Josephus (BJ III 214-221) and Ammianus (XXIII 4 8-9). Apollodorus points out that a ram in several pieces must have several hanging points to keep its strength and solidity (161.6-8), and although the principles behind the use of a ram were fairly basic, Apollodorus recommends its use against gates, angles of towers, and any other weak points in the walls (157).

Rams could vary in strength, and two of the more powerful seem to have been the Roman ram nicknamed Victor by the Jews at Jerusalem (BJ V 299) and the hundred year old Persian ram used at Bezabde (AD 360). This latter ram was made up from several pieces, presumably for easy transportation, and this

does not seem to have affected its strength. Whilst it seems most likely that reconnaissance would be made to discover weak sectors of the walls against which the ram would have more effect, this is only specified in a couple of cases. At Singara (AD 360) the Persians used the ram against the still damp mortar in the joints of a newly built walls and forced an entry at this point, whilst at Bezabde (AD 360) they attacked the parts of the walls which were unstable and falling down.

Rams are one of the few pieces of siege equipment illustrated frequently in Roman sculpture (eg: Trajan's Column scene 79; Arch of Severus, panels ii and iv). Most of these, and those described in the literary sources, were suspended in testudines with wooden frames and the steeply pitched roofs recommended by Apollodorus (154.1-5) so missiles thrown down would roll off. The heads of all the rams depicted in illustrations are actually in the shape of the animal they are named after, but it is difficult to tell whether they would actually have been this shape; Apollodorus states that the head of the ram should be in the shape of an anvil (ἀκμωνι; 161.4), and the Greek ram head from Olympia is this shape, though it does have a decorative ram's head on either side (Münich 1972 101).

Vegetius makes several suggestions for countering rams (IV 23); heavy missiles could be thrown down from the walls, even pieces of column and stone, onto the shelters and rams in an attempt to break off the ram heads; padded mats (centones) could be lowered to cushion the blows of the ram, or the defenders could catch the ram head in a noose and haul it up the wall. These are fairly obvious suggestions to make, and other sources show that such defences had been in use since Assyrian times (see above p.181).

Missiles thrown down from the walls often included chunks of masonry, millstones or column drums (Bezabde AD 360; Adrianople AD 378), and the very large rounded stone from Cremna (AD 278) may have been used for this purpose rather than as an artillery shot. At Haliartus (171 BC) the defenders used stones and lead weights to destroy the rams whilst at Ambracia (189 BC) cranes were used to drop the weights. Josephus was able to protect the walls of Jotopata (AD 67) for a while using sacks filled with chaff, until the Romans cut them down using reaping hooks attached to long poles. At Marseilles the defenders caught a ram in a noose and wound it up with a windlass (Vitruvius de Arch.X xii) and the Persians did the same at Bezabde (AD 360).

The treatise of Apollodorus may provide a clue to the identification of three devices illustrated on Trajan's Column (scene 308) which have been the object of much discussion[16]. Apollodorus states that all movable pieces of siege equipment, particularly those with wheels, should also have wooden or iron pegs to secure them into the ground while they were in use (140.12; 157.1-6). Each of the devices depicted on the Column appears to have two attachments near the ground on the 'axle' which may be pegs, indicating that they may have been mobile engines for offensive actions.

Apollodorus describes one ram which is particularly useful against the defenders on the walls (188.2-9), and the arm of the ram itself is compared to that of a single armed stone throwing catapult (λιθοβολος μονανκων). This might look very similar to the representation on the Column, and the barrel-shaped objects shown at the end of the arms may be the iron ram heads mentioned by Apollodorus. The shape of this is fairly similar to the ram heads shown in illustrations of later texts of the treatise. Unfortunately, as with

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[16]See Frere & Lepper 1988 165-167 for a synopsis of the different theories.

most of the equipment he describes, Apollodorus does not explain how this particular type of ram is used, and it is difficult to see exactly how it would work, though the arm of the right hand machine may be drawn back to a suitable position for swinging against the wall or the defenders on it. However, it is possible that the three machines on the Column may show the type of ram described in the treatise.

Mines

Much advice is given in the treatises concerning the construction of mines by both attackers and defenders, and some on how they could be countered. Both Apollodorus and Vegetius (IV 24) describe the use of mines in the destruction of defensive walls, undermining the walls and underpinning them, then firing them, and the latter also mentions how tunnels could be used to enter a city secretly[17]. Vegetius suggests that cities should have a wide deep ditch filled with water to prevent any mining attempts (IV 5) but provides no other advice on countering them.

As stated above (p.181), mines, like rams and siege towers, were in use from the Assyrian period, and there are examples of mines in Roman sieges dug for both the purposes mentioned by Vegetius. Veii (396 BC) supposedly, and Maozamalcha (AD 363) were both taken through mines dug into the towns, though in the former case the Romans are supposed to have entered the citadel through a cuniculus or drainage channel. At Ambracia (189 BC), Athens (87 BC), Marseilles (49 BC) and Dura (AD 256) attempts were made to undermine

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[17]Interestingly, Vegetius notes that the Bessians were particularly good at mining because of their experience with mineral mining (IV 24). Caesar notes that the Sotiates and the Gauls at Avaricum were particularly skilled at digging mines because they were experienced copper and iron miners.

the walls with varying degrees of success[18]. Vitruvius describes how the defenders at Marseilles created a water-filled basin inside their walls so when Caesar's sappers opened their mines they were flooded (de Arch X xi), an action similar to Vegetius' suggestion of a deep moat, but a reaction to the Caesarian mining operations rather than a precaution made before the siege.

Wall breaches

Should the walls succumb to any of the methods of attack described above, then another line of defence could be provided by the construction of a concave semicircular wall to cover that part of the original wall that was about to be breached (Veg.IV 23), and this would also leave the attackers open to fire from the flanks as well as the front if they tried to attack the inner wall.

This was done at Athens (87 BC), and because Sulla's soldiers were coming under such heavy fire when he tried to assault the newly built wall, he was forced to retreat. When he later renewed his attack on this section of the wall and succeeded in breaching it, he found that the defenders had already anticipated this and built several others like it. The same happened at Jerusalem (AD 70) when the Romans tried to attack the fortress of Antonia, and the Romans made no concerted effort to assault the new wall because of the dangers[19]. The Sicarii at Masada (AD 72/73) built a wall of earth and timber inside the stone wall of the fortress and this absorbed the blows of the ram

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[18]At Ambracia the Romans were driven out of their mine by poisonous fumes pumped in by the defenders, at Athens the walls collapsed but the defenders had already built an inner wall, at Marseilles the attackers' mines were flooded and at Dura two sections of the defences were collapsed by firing the mines but the attackers appear to have been unable to gain entry as a result.

[19]The fortress was eventually taken by a 'stratagem' when a small group of Romans entered the fortress secretly and sounded their trumpets; the main Roman force attacked at this point but the Jews fled, believing the fortress already captured.

which had breached the outer wall. Later fortifications went a step further and had bastions specifically designed with inner walls and retrenchments that could be easily defended if the outer wall was breached (eg: Lucca, 16th-17th century).

Artillery and missiles

Vegetius (IV 6) states that attackers used artillery to keep the defenders off the walls whilst an attack was made, and later stresses the role of artillery in the defence of fortified positions, against both men and machines (IV 22). Elsewhere he describes two types of incendiary missiles which were intended for use against siege engines (IV 18). Other writers provide very little information on the actual use of artillery and limit themselves to very detailed descriptions of their construction.

The effectiveness of artillery during an attack to keep the defenders off the walls has been mentioned above (p.183, 184, 186). Marcellus placed artillery on his ships to provide covering fire for his troops at Syracuse (214-212 BC) and the artillery in the Persian siege towers at Amida (AD 359) drove the defenders off the walls during an abortive attempt to take the town by storm. It was also used to protect troops working near the walls; at Bezabde II (AD 360) Roman artillery covered attacks with rams whilst at Jotopata (AD 67) it provided protection for soldiers building a ramp against a vulnerable section of the wall. Josephus takes great delight in describing the effectiveness of a particular ballista which knocked off a man's head and flung it more than 600 yards (BJ III 257). At the same point, he states that the Roman machines were able to knock off battlements and corners off towers. Artillery used by defenders could be equally effective as Vegetius suggests (IV 22); at Amida

the Roman onagri were used with great effect against the Persian siege towers and destroyed them.

However, although both attackers and defenders used artillery against fortifications and siege engines, it seems to have been used most often as an anti-personnel device. Various exceptionally powerful catapults are reported in the literary sources, eg: Archimedes' artillery at Syracuse (214-212 BC), the catapults at Marseilles (49 BC) which could fire spiked wooden beams 12 feet long, the artillery of Legion X at Jerusalem (AD 70, and see above note 13), and some of the catapults at Hatra (AD 199/200) which seem to have fired two missiles simultaneously.

Finds of both catapult bolts and ballista balls are common at siege sites such as Carthage (Marsden 1969 78) and Numantia (Marsden 1969 82), both of which have produced quantities of ballista balls. 67 catapult bolts were found in the excavations at Hod Hill and their locations have led Richmond to postulate the position and height of an artillery tower from which at least two catapults were fired (Richmond 1968 32-33).

In addition to artillery, lead or clay slingshot could also be used as an anti-personnel device and for incendiary purposes. Corbulo's assault on Volandum (AD 58) included covering fire from two types of slingers (libratores and funditores) who fired glandes from a hill. As with artillery missiles, lead and clay glandes have been found at a number of sites including Burnswark, Beththera (AD 135), Cremna (AD 278), and particularly Perugia (41 BC) and Asculum which was besieged by Pompeius Strabo in 90-88 BC (Appian BC I 47; EE VI 1885). Many of these glandes were inscribed with the names of legions, officers, commanders, and derogatory comments and illustrations as part of

an airborne propaganda campaign. According to Appian, Sulla was kept informed of the situation in Athens (87 BC) by traitors firing glandes inscribed with messages towards the Romans. As a result of information received in this way, Sulla was able to ambush and capture a supply train.

Incendiary devices

Artillery, slingers and archers could also be used to fire incendiary devices and missiles, or they could simply be dropped on attackers. Vegetius (IV 8) states that tar, sulphur, pitch and liquid oil should be prepared for burning the enemy's engines, and incendiary devices were frequently used in siege warfare (see above p.181). At Uxellodunum (51 BC) the Gauls rolled down burning barrels filled with incendiary materials onto the Roman siege engines; Josephus poured boiling oil onto a Roman testudo formation at Jotapata (AD 67) to break it up, and the Hatrenes fired burning naphtha at the Romans (AD 199/200)[20]. The use of sulphur (Dura, AD 256) and pitch (Bezabde I, AD 360) is also attested, and in the latter case the Persian defenders may have fired their pitch and bitumen filled baskets from artillery[21].

Vegetius describes two types of incendiary missile which could be fired by archers or artillery, the malleolus and the falarica (IV 18). The malleolus was like an arrow, and this corresponds with the description given by Ammianus (XXIII 4 14) who states that it should be shot slowly from a loose bow to keep the fire alight. The falarica, however, is not mentioned by Ammianus, but Vegetius states that it was fired by catapult and could pierce solid iron or the

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[20]The same happened to Lucullus in Parthia in 69 BC (Dio xxxvi 1). Dio states that naphtha was full of bitumen and was almost impossible to extinguish.

[21]Both sides at Actium in 31 BC fired pots full of charcoal and pitch at each others' ships by means of artillery (Dio ii 34 2).

protective layers of a siege engine, allowing the burning material to reach the wooden structure.

Incendiary arrows fired by archers were frequently used in siege warfare; the Epirote relieving army attacked the Roman besiegers at Ambracia (189 BC) with torches, tow, pitch and malleoli; the Nervii attacking Cicero's winter quarters (54 BC) fired incendiary darts (iacula fervefacta) as well as red hot clay glandes to burn the camp. Malleoli are also mentioned at Singara (AD 360), the two sieges at Bezabde (AD 360), Aquileia and Maozamalcha (both AD 363), particularly by the defenders trying to destroy assault equipment. The heads of malleoli have been found at Wroxeter and Bar Hill on the Antonine Wall (James 1983 142-3), so they need not be associated exclusively with sieges, though they do seem to have been most commonly used under these circumstances.

Historians do not generally refer to incendiary missiles fired by catapults as falaricae, but do specify that they are shot from artillery. These are the πυρφοροι of the Greeks, used at Tyre, Salamis and Rhodes in the late 4th century BC[22]. One of the earliest recorded uses of these missiles by the Romans was in 156 BC when Marcius Figulus was besieging the town of Delminium in Dalmatia. According to Appian, he fired wooden shafts two cubits long and covered with flax, pitch and sulphur into the town using catapults (Appian Illyrian wars 11). At Marseilles (49 BC) a siege ramp was set on fire by red hot iron bars fired from catapults; Corbulo's missile barrage at Volandum (AD 58) included firebrands shot from catapults, and the Romans defending Vetera (AD 69) destroyed the Batavians' shelters with fire bolts

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[22]Tyre, 307 BC (Arrian Anab.II 21 2); Salamis, 307 BC (Diodorus Siculus XX 48 6); Rhodes, 304 BC (Diodorus Siculus XX 88 2).

shot from catapults (ardentes hastae). James (1983) has identified the head of an incendiary catapult bolt from Dura and although it is not certain which side was firing them, the bolt is most likely the falarica mentioned by Vegetius and not the malleolus which is only ever referred to as being fired by archers.

Blockade and circumvallation

As stated above (p.183, 199), if assault on a stronghold failed, or the attacking general did not wish to attempt an assault for some reason, like Scipio at Numantia (133 BC), the alternative was to blockade the place and attempt to induce surrender through starvation. Usually this took the form of a line of circumvallation, a physical barrier preventing the defenders from escaping or obtaining supplies, and protecting the besieging army from sorties by the defenders.

The military treatises say little about the blockade of strongholds, though Vegetius details the supplies a city should obtain in case of blockade (IV 7-11). Circumvallations are mentioned by Apollodorus and Vegetius, the former providing some details (140.1-3). He states that the besieging force should dig a V-shaped ditch at least five feet deep (1.52 m); the debris from the ditch should be used to build a rampart, and this should be buttressed with stones. Vegetius mentions that the circumvallation or loricula should be beyond weapon range of the besieged and consist of a ditch and rampart with palisade and turrets (IV 28). Vegetius seems to imply that a physical barrier of the type he has mentioned was no longer used by besieging forces, an observation which appears to be corroborated by the archaeological and other literary evidence; the latest recorded lines of circumvallation date to the sieges at Beththera (AD 135), possibly Hatra (AD 199/200) and Cremna (AD

278), although this was a line of blockade, a full circumvallation being unnecessary because of the topography of the site.

Because circumvallations usually indicated large-scale operations were being undertaken, Roman historians usually mentioned their construction and frequently gave details about the various components which formed the work. In addition to this information, the archaeological remains of a circumvallation are often one of the few physical features of a siege to survive[23].

Although Apollodorus stated that the spoil from the ditch should be used to construct the rampart, this was not necessarily the case. The materials used in the construction of ramparts varied according to what was available; in a particularly rocky area, or where a ditch was unnecessary or impossible to dig, a stone wall might be constructed instead; the circumvallation wall at Masada (AD 72/3) was of stone because that was the only material available.

Although Vegetius suggests attaching the additional defence of turrets to the rampart, he gives no indications as to their possible use, though the literary sources suggest these included for signalling and artillery (Numantia, 133 BC) and observation (Carthage, 146 BC). Towers along the rampart are recorded at a number of sites (eg: Carthage, Numantia, Alesia (52 BC), Machaerus and Masada (AD 72/3)).

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[23]The traces of a circumvallation can lead to the identification of a siege site, such as Beththera (AD 135), and can vastly increase knowledge of a particular siege mentioned in the literary evidence; at Machaerus (AD 72/3) and Beththera (AD 135) for example, no mention is made in the literary sources of a circumvallation, and at Cremna (AD 278) recent archaeological discoveries have shown that operations were on a much larger scale than suggested in the literary sources.

The towers at Machaerus and Masada did not extend all the way round the circuit of the wall. At Machaerus they appear only to have been built on the south west sector whilst those at Masada are along the eastern side. These sectors, however, are more open to attack by the besiegers and it is possible that towers were considered an extra defence for potentially vulnerable sectors of the circumvallation. The distances between towers varied considerably between different sites (25-35 m. at Machaerus, 50-75 m. at Cremna and 80-100 m. at Masada), and also between individual towers. If towers were for the siting of artillery, they could be some distance apart, for the effective range of a catapult was up to c.300 m.(Marsden 1969 chap.iv), and the siting of towers was probably affected more by topographical considerations than a desire for regularity of intervals, as long as any artillery in them could cover the area between towers.

Apollodorus recommends a V-shaped ditch at least 5 feet deep in front of the rampart, which is comparable with the depth of marching camp ditches according to Josephus (6 ft, BJ III 84) and Vegetius (7 ft, I 24). As suggested above, not all ramparts were accompanied by a ditch, especially where the nature of the soil made this difficult, as at Machaerus and Masada (AD 72/3). Most ditches seem to have been V-shaped, though the outer of the two ditches at Alesia was found to be flat-bottomed as Caesar states. The depth of ditches varied considerably, and were usually deeper than the minimum 5 feet (1.52 m.) specified by Apollodorus (eg: Alesia (52 BC) 2.4-2.6 m.; Perugia (41 BC) 8.8 m. according to Appian, though this seems rather unlikely).

No ditch was found at Numantia although the literary sources state there was one, and as with marching camps, the defences of circumvallations may have

been in accordance with the potential threat of a sortie or the arrival of a relieving army. Caesar's very elaborate defences at Alesia (52 BC) included a contravallation to protect his troops from the Gallic relieving army as well as a circumvallation to blockade the Gauls in the hillfort and protect his soldiers from sorties.

The distance between the circumvallation wall and the stronghold under siege was important, according to Vegetius (IV 28), who states that the loricula should be beyond weapon range of the besieged. This distance varied from site to site as well as at individual sites (Numantia (133 BC) 250-1000 m.; Alesia (52 BC) 660-1800 m.; Machaerus (AD 72/3) 330-570 m.; Masada (AD 72/3) 275-650 m.; Cremna (AD 278) 125-180 m.). In most of these cases the investing line would be out of range of the defenders' missiles.

At Numantia, Alesia, Machaerus and Masada the distance between the circumvallation wall and the besieged town was increased when the ground between them was open and more easy, probably for the same reason as the positioning of towers on blockade lines; that those sections of the siege lines were the most vulnerable and the greater distance that a sortying party would have to cover, the longer the besieging force would have to react and in particular to train missiles on the enemy.

Since the effective range of a catapult was up to c.300 m. (Marsden 1969 chap.iv), the walls of Numantia, Alesia, Machaerus and Masada were in many places out of the artillery range of the Roman besiegers, any artillery on these sections of the circumvallation was probably intended primarily as a defence against sorties by the besieged. The blockading wall at Cremna (AD 278) was well within artillery range of the town and this short distance would tend to

back up Mitchell's claims that some of the towers on the besiegers' first wall held artillery, and that this was for use as an offensive weapon rather than a defensive one, as was probably the role of most artillery on circumvallations[24].

Although Onasander does not mention the use of circumvallation during a blockade, he does advocate the starving out of the besieged, and even suggests that the besieging general aggravate the scarcity of food in the town by sending all prisoners except men of military age into the town (xlii 23)[25]. These new arrivals would be useless in action but would consume the supplies more quickly. Caesar may have had this intention when he refused to allow the Mandubii through his lines at Alesia (52 BC) after they had been expelled from the town by the Gauls precisely because of the lack of supplies. A similar incident occurred at Cremna (AD 278); when the townspeople Lydius had expelled from the town because of food shortages were sent back by the Romans, Lydius is supposed to have hurled them into the ravines surrounding the town. Onasander's rather ruthless suggestion would appear to contradict a lot of his advice concerning the conduct of generals (see below, Chapter 8, on Morality in Warfare), but that deals almost exclusively with the behaviour of generals after the capture or surrender of cities. The implication is clear; once the war was over the general could afford to be magnanimous, but as long as the war continued, any method of inducing defeat or surrender was open to him.

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[24]Since the loricula mentioned by Vegetius was for the defence of the besieging army, it would make sense to provide the additional defence of artillery against sorties which could be very dangerous (see above p.188).

[25]Frontinus lists a few stratagems on preventing supplies arriving (III iv), and obtaining supplies in time of blockade (III xiv-xv).

Conclusions

The treatises cover siege warfare in a rather different way to the other subjects discussed above. Although Vegetius can list the precautions that can be taken in case of siege, and writers can describe the various pieces of equipment available for both attack and defence, there is very little advice on the practicalities of besieging a city or defending one under siege. The two authors who give their reasons for not covering the subject of siege warfare comprehensively are Onasander and Frontinus, though their justifications are different. Frontinus did not deal with siege machines because be believed they had already been developed to the limit (Strat.III Pref.), and Onasander because it was not his place to tell the general what equipment to use when so many variables were involved (xlii).

The techniques of siege warfare developed little from the Assyrian period to the late Roman; the equipment was essentially the same, as were the methods of countering it. Thus Assyrian reliefs show defenders catching the heads of rams in nooses which Vegetius also recommends over a thousand years later (IV 23). The major changes appear to have been the introduction of torsion artillery in the 4th century BC and the use of circumvallations, neither of which was a Roman development, though the circumvallation does seem to have become particularly popular in the Roman period.

This lack of development in siege techniques may account for Frontinus' lack of interest in the subject, and although there were improvements and changes in torsion artillery, since his Strategemata is fairly general, the inclusion of such details would have been out of place. It also explains why for the most part there is a very strong relationship between the methods described in the treatises and actual field practices.

Analysis of siege techniques suggests that although both attackers and defenders had more time to react and devise defences and methods of attack, actions were more likely to be counter-reactions, depending on what the enemy was preparing or doing. Thus the defences Josephus devised at Jotopata (AD 67) were in reaction to the Roman techniques, although some were very well known by that time: increasing the height of the wall opposite the Roman siege ramp; lowering chaff-filled sacks in front of the ram head (and the Romans' use of reaping hooks attached to long poles to cut the sacks down was a reaction to this); pouring boiling oil on the Roman testudo formation; and pouring boiled fenugreek on the gangway boards. Equipment and supplies could be prepared, as Vegetius advises (IV 7-11), but Onasander is correct when he says that a general will use the available equipment as the opportunity arises, and this depends on luck, the strength (and actions) of the defenders, and the skill of the engineers (xlii).

Technical treatises were available for detailed descriptions of artillery, and more general works such as those by Apollodorus and Vegetius for information on other equipment such as siege towers and battering rams. Vegetius provides a little information on the use of these devices and defences against them, but the general seems to be expected to know when to use them. The 'instructions for use' are very scanty compared with the details Vegetius, for example, gives on the order of march or line of battle. This may be for a number of reasons: siege techniques had changed so little that detailed instructions were considered unnecessary as they were well known anyway; Greek and Hellenistic treatises by writers such as Aeneas Tacticus and Philo were still relevant and may have been available, or similar Roman works that are no longer extant may have covered the subject; and as suggested above,

many of the actions taken in siege warfare were in reaction to the enemy's operations.

As stated above (p.178) the emphasis in Vegetius' book on siege warfare is on defence, whereas earlier works were concerned with both defence and offence, particularly the latter. Like Vitruvius (de Arch.I v), Vegetius' suggestions for the defence of a city (IV 1-8) are made bearing in mind the possibility of a siege. Onasander, on the other hand, does not touch upon the defence of fortified positions at all, and this may be because his model general of the 1st century AD would have been concerned primarily with attacking the enemy at a time when the Empire was still essentially expansionist[26]. Vegetius, however, writing probably after the Roman defeat at Adrianople in AD 378, may be stressing defence because of the insecurity of some parts of the Empire at this time, and because now more than ever Roman towns were facing attack by both barbarians (eg: Adrianople, AD 378) and other enemies with siege techniques as sophisticated as those of the Romans (eg: the sieges during the wars between Rome and Persia, AD 359-363).

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[26]Successful offensive actions were also just about the only way for a general to gain recognition and glory at this time as well (cf: Corbulo's complaints when recalled from Germany by Claudius, Annals xi 20).

Morality in Warfare

Introduction

Most ancient military treatises dealt not only with the practicalities of warfare but also touched upon the personal and moral qualities of the general. Onasander, for example, seems almost more concerned with the character and behaviour of the general than with what strategies and tactics he should be employing. Cicero in addition mentions some of the established traditions concerning the conduct of war. Westington (1938) has dealt comprehensively with the issue of morality in warfare up to 133 BC. After this date there is much less evidence for atrocities and behaviour in war, and the treatises themselves deal primarily with morality in the field of open engagements and siege warfare. Because of these factors this chapter will consider the subject of morality only the two situations mentioned above and will generally avoid examples discussed by Westington. In addition, the behaviour of non-Romans will not be discussed unless it is directly relevant to that of the Romans, for example Roman revenge for native atrocities.

The Treatises

Cicero states that the Fetial code included humane laws concerning the declaration and conduct of war (de Offic.I 36), and elsewhere mentions the customs of war (mores belli, Verr.iv 116), though these are probably established traditions rather than the actual laws of the Fetial code[1]. The advice given by Polybius and Onasander may also be considered as fairly obvious hints or established military conventions rather than laws.

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[1]Since the declaration of war was a matter for the Senate or Emperor in Rome and not the general on campaign, the subject of just and unjust wars will not be considered here.

Cicero gives some general advice on behaviour and morality in the de Officiis (I 34-36), and when describing the qualities necessary for the perfect general (Pro Leg Man.10-16); a general should control his troops strictly, not let them plunder for his personal gain, and to show mercy to those who surrender (Pro Leg Man.13); protection (presumably from Roman soldiers) must be granted to those who surrender; in the destruction and plundering of cities nothing should be done without good cause or with excess cruelty, and it was the general's duty to punish only the guilty and spare the rest (de Offic.I 82). Connected with this is a statement that those who have not been cruel and barbarous in the conduct of war should be spared. Polybius also emphasized the importance of showing generosity to the defeated (V 11 5), and urged that punishment should not be excessive because it was better to conquer the enemy by generosity than by force (V 12 2).

Onasander puts forward several points on the subject, some of which echo Cicero's comments; the besieged were more likely to surrender if they knew they would not face slaughter, and generals who destroyed and massacred made the war more difficult as cities were less likely to surrender (xxxviii). Thus acts of desperation from an enemy with nothing to lose should not be encouraged (vi); the enemy's country should not be ravaged until the enemy had been informed of the general's intentions, to allow them time to surrender; plundering should be strictly controlled (vi) and prisoners of war should not usually be killed while the war was still in progress (though enemy allies could, if it was in the general's interest). In the same way, in sieges, the general should prevent a massacre especially if the defenders seemed likely to hold out or seize the citadel because if they expected to be killed they would

fight more fiercely and desperately (xlii)[2]. These suggestions are all useful but fairly obvious; the idea was to encourage the surrender of cities and armies by demonstrating that this was preferable to continued resistance. While Cicero's admonishments tend to be rather abstract and sometimes of a purely moralistic nature, those of Onasander, though containing these moralizing overtones, also include suggestions for their application. He is not above some rather cold-blooded comments about which prisoners could be killed off, even suggesting that prisoners spared in order to encourage surrender could later be executed, if it was in the general's interest to do so (xlii).

Other, perhaps more formalized, conventions involving the treatment of cities under siege are mentioned only briefly by some of the sources but are well illustrated in the historical sources. These relate to the method of sacking a city and the distinction shown between towns which have surrendered and those taken by assault. These conventions will be discussed in greater detail below.

The general impression one gets from the treatises is that the treatment of prisoners and cities should be varied according to the situation and what the general hoped to gain from it; both leniency and severity could be used to encourage the surrender of the enemy, which the military writers suggest was preferable to defeating an enemy by force.

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[2]cf: Vegetius' advice concerning a fleeing enemy following a pitched battle (III 21); flight should be facilitated because an enemy that is surrounded with nothing to lose will fight more ferociously (see above Chapter 6, on Pitched Battles).

Mercy and Brutality

Cicero implies that the general should show mercy on every occasion though, as stated above, Onasander suggests that mercy should be used along with brutality when necessary. Tacitus describes how Corbulo used the panic created by the demolition of Artaxata in order to capture Tigranocerta (Annals xiv 23), "for if he destroyed it, he would increase the enemy's terror; if he spared it he would be praised as merciful". Corbulo apparently varied his treatment of the enemy, showing lenience to those who surrendered and harshness to those who resisted, flushing out fugitives by fire. Agricola also combined the use of terror tactics with mercy during his second year of campaigning in Britain (Agric.20), which supposedly encouraged the surrender of many tribes who preferred to experience the governor's mercy.

Caesar had a wide reputation for clemency which does seem to have been justified (eg: BG vii 40; BC I 75; Vell.Pat.II 87), but his use of clementia reflects Onasander's statements rather than those of Cicero. Thus he was merciful towards the Aedui who were planning to join the revolt of Vercigetorix (BG vii 40), but this was to retain the tribe as an ally, and when Petreius executed some of Caesar's soldiers during a period of fraternization in the civil war, Caesar made sure that all his enemy's men were sent back unharmed (BC I 75). As a result of this several of Petreius' officers deserted to Caesar.

According to Caesar, his reputation for mercy encouraged the surrender of enemy forces and cities such as native cavalry in Africa (B.Afr.92) and the city of Utica following the defeat of Cato (B.Afr.88). Aulus Hirtius also makes this claim for Caesar in the case of the Bituriges who had revolted but then

surrendered (BG viii 3)[3]. In spite of his reputation, Caesar was quite ready to act very harshly, if it was in his interests to do so (cf: Onasander vi and above, p.209). However, these examples usually involve exceptional circumstances such as revolts and civil war, and these will be discussed below.

Having a reputation for mercy or cultivating one was not the only method of encouraging the enemy to surrender. Magnanimous behaviour and various forms of psychological warfare are suggested by Frontinus and well illustrated by the author and by other historians. The tale of the schoolmaster of Falerii is frequently quoted not only by historians as an example of traditional Roman magnanimity (Livy v 27; Val.Max.vi 5; Plut.Cam.10), but also by military writers as stratagems, to illustrate the effect such behaviour might have[4]. Another similar stratagem is given in Book IV of Frontinus' Stratagems; during the revolt of Civilis a city of the Lingones had gone over to the rebels and as the author was advancing with an army the citizens feared their land would be plundered. When the inhabitants remained unharmed and lost none of their property they abandoned Civilis' cause and handed over a large number of armed men (Strat.IV iii 14). Similarly, when Octavian took the town of Terponus which the Illyrian tribe of the Iapydes had abandoned, he did not destroy it in the hope that the tribe would surrender, which it did (Appian Illyrian Wars 18).

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[3]Caesar seems to have achieved similar results in Gaul at least by his success, building up such a reputation among the Gauls for his ability to capture hillforts that Vellaunodunum surrendered in 52 BC as soon as he had built a circumvallation (BG vii 11).

[4]When Camillus was besieging Falerii he refused to accept the young hostages the traitorous schoolmaster presented him with and instead sent them back to their parents. The Faliscans were so impressed with their enemy's action that they immediately surrendered.

Cicero and Onasander do not advocate the use of terror tactics in warfare but Frontinus does, and gives several examples of their effectiveness (Strat.II ix 2-5). Sulla is supposed to have broken the resistance of the besieged at Praeneste by fastening on spears the heads of Praenestine generals who had been killed in battle and displaying them to the defenders (Strat.II ix 3), and Corbulo encouraged the Armenian city of Tigranocerta to surrender in a more dramatic fashion; he executed a captured Armenian noble and shot his head out of a ballista into the town. It fell in the middle of a council meeting and at the sight of it the besieged immediately surrendered (Strat.II ix 4)[5]. However, Tacitus reports that Ostorius Scapula's intention to wipe out the whole tribe of the Silures only encouraged them to resist even more strongly (XII 38), illustrating the dangers of taking severity too far.

Surrendered and captured cities and forces

The sources suggest that it was better to encourage the enemy to surrender rather than to have to resort to the uncertainties of military action (cf: Veg.III 9 and above p.209). Thus the treatises include advice on encouraging surrender and the subsequent treatment of both cities and field forces which surrendered, but tend to concentrate on the former. Despite the obvious importance of this subject in the treatises, none of the writers make the suggestion that a commander might offer a city or a field army the opportunity to surrender before engaging his forces. The implication seems to be that the initiative had to come from the enemy, usually in the form of ambassadors requesting to surrender (eg: BG II 13; VII 11).

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[5]Displaying the heads of those killed in battle or firing them into besieged towns with slings or artillery was an aspect of psychological warfare also employed in later periods and particularly during the crusades: Christians hurled the heads of Turks killed in battle into the town of Nicæa to terrorize the garrison (Gesta Francorum et aliorum Hierosalimitanorum viii). Corbulo, however, seems to have gone one step further by actually executing a captive rather than simply decapitating corpses.

The historical sources, however, suggest this was by no means the case; besieging generals did request the cities they were attacking to surrender, particularly before or during a long or hard siege, to prevent loss of life and waste of time and supplies, though this is generally not the case with large field forces. Thus when Julian wished to avoid spending time and losing lives besieging the Persian fortress of Anatha, he persuaded the defenders to surrender, thereby avoiding a dangerous siege (Ammianus xxiv 1 8). The fortress was destroyed but the defenders were treated well. Titus made several attempts to persuade the defenders at Jerusalem to surrender, making one particularly impassioned effort when he had failed to take the strongest parts of the city by storm and was about to resort to circumvallation and blockade (BJ V 36ff). Had the Jews surrendered, it is doubtful that a large scale massacre would have taken place as happened when the city was eventually stormed. Similarly, Severus offered the Hatrenes the opportunity to surrender after his troops had breached the outer of Hatra's two walls (AD 198).

Invitations to surrender were often made after the failure of the initial assault, as in the case of Jerusalem and Hatra above, and in the cases of Q.Cicero's winter camp (54 BC), Vetera (AD 69) and Adrianople (AD 378), where the barbarian besiegers had also been frustrated in their attempts to take their objectives by storm.

It is possible that by the 4th century AD the matter of invitations to surrender may have become more formalized; the defenders were usually invited to surrender at the beginning of a siege and sometimes given several days to do so (eg: Singara, Ammianus xx 6). This is particularly evident in the wars between Rome and Persia (AD 359-363) which involved a number of sieges, but

it was not just the case in external warfare; during the civil war between Constantius and Julian in AD 361, Aquileia was held by supporters of Constantius. Julian's supporters gave the defenders an opportunity to surrender before beginning the assault (Ammianus xxi 12). However, these requests to surrender at the start of a siege seem to have been as much a formality as a realistic expectation; although the cities mentioned by Ammianus were asked to surrender they rarely did so. According to Ammianus, Sapor believed that the defenders at Amida would be so terrified at the sight of his army that they would immediately surrender, and at the very least to surrender when invited to do so (Ammianus xix 13).

Whether or not to surrender was an extremely important matter for any city under siege. On the whole, though with a few exceptions which will be discussed below, cities which surrendered usually fared much better at the hands of their captors than those taken by storm. This seems to be some kind of rule of warfare and is mentioned by Livy when describing the capture of the rebel Latin colony of Pometia in 502 BC (II 17 2). The colony surrendered just as the Romans were about to storm it but its fate "was no less horrible than if it had been taken by storm". It is this convention on the treatment of surrendered cities, rather than any reputation a particular general might have for mercy, that is likely to have encouraged cities to surrender. As seen above, some cities surrendered at the very start of a siege, though many more did so when the defenders realized that the city was certain to be taken, as at Marseilles, or when faced to do so through starvation like Numantia.

When Caesar was besieging the Gallic tribe of the Atuatuci in 57 BC, during the siege the defenders enquired about terms of surrender. Caesar stated that he would be merciful provided that they surrendered before the battering

ram touched the wall of the oppidum (priusquam murum aries attigisset, BG II 32)[6]. Josephus mentions the despair of the Jews when the Romans brought their rams to bear on the walls at Jerusalem (BJ V 277), and although various skirmishes had taken place before this point, this seems to represent the moment when the siege proper started. The implication is that there may have been some kind of formal convention concerning this matter, and this is confirmed by Cicero's statement that mercy should be shown to those who have surrendered "even though the battering ram has hammered at their walls" (quamvis murum aries percusserit, de Offic.I 35).

Theoretically then, once the siege had formally begun, the general may have been entitled to treat the city however he wanted whether or not it surrendered. In practice, though, because it was usually in the general's interest to be merciful and so encourage other places to surrender, virtually all cities which surrendered, at whatever stage of a siege, fared far better than those taken by assault. This is the case even with cities that had revolted and during civil wars when the treatment of defeated enemies was likely to be harsher and more violent (see below pp.218 & 221). In the catalogue of sieges (Appendix 3), there are only two examples of the inhabitants of a city which surrendered being massacred (Locha, Appian Punica 15; Capsa, B.Jug.91). In the first instance this was against the wishes of Scipio, according to Appian; the Roman soldiers refused to obey the recall following the surrender of Locha, scaled the walls and began an indiscriminate slaughter because the siege had been a hard one, an excuse made elsewhere to explain excessive violence following the capture of a city (Capsa B.Jug.91; Avaricum, BG VII 28, though in the latter case there were other reasons for the behaviour of

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[6]Interestingly, when the Atuatuci did surrender, Caesar shut them up in their oppidum overnight for their own protection (cf: Cicero de Offic 82).

Caesar's troops, see below p.220, and also Annals iv 25, for actions of troops at the end of the revolt of Tacfarinas). Capsa also surrendered but the town was fired anyway, the men massacred and the rest of the population sold into slavery. Sallust (B.Jug.91) describes this as a violation of the rules of war (contra ius belli).

Cicero's statement, that mercy should be shown to those who have surrendered "even though the battering ram has hammered at their walls" does, therefore, seem to be realistic and a generally accepted rule of war, at least by the 2nd to 1st century BC.

Paul (1984 226-7) notes that from the 2nd century BC there was an increasing tendency to treat those who surrendered more leniently, or at least to condemn those who insisted on severe punishment. He suggests that this was to protect Rome's long term interests and due to the belief that lenience would further Rome's military aims. This tendency is noted in Cicero's fourth Verrine oration where he accuses Verres of committing outrages that would not be done "in these days when the city was taken (capta), however much the passions of war-time, military licence, the custom of war and the right of the conqueror might provoke them." (in Verr.iv 116). The statement also suggests that, even though the treatment of captured cities might be more lenient than in the past, those taken by storm (captae), would still suffer.

Cities which were taken by storm almost invariably fared badly; the assault was usually followed by the indiscriminate slaughter of the population, though occasionally this was confined primarily to men of military age (eg: Volandum). However, in the confusion following the storming of a city, it is debatable how discriminating the victorious soldiers would have been. Towns would also be

plundered and occasionally razed to the ground (eg: Numantia, Jerusalem, Maozamalcha)[7]. Those who managed to survive the slaughter might be sold into slavery or simply dismissed. The treatment of the different groups of prisoners at New Carthage by Scipio is interesting; citizens of the city were released, artisans were reduced to slavery for the duration of the war and male non-citizens and slaves were sent to the fleet (Polybius X 16).

Very occasionally the defenders of a town were spared even though it was taken by storm. At Syracuse, Marcellus allowed his soldiers to plunder the city but ordered them not to kill any of the free inhabitants (Livy xxv 25). Archimedes seems to be the only reported casualty (Plut.Mar.19). However, Westington doubts that the general's order was very strictly obeyed and describes the plunder of the city as particularly thorough (1938 93ff). He also points out that slaves were not exempt from the general's order about clemency. No casualties are reported at Thala (B.Jug.76), but this might be because Sallust is more interested in describing the destruction of the loot by Roman deserters before its capture and their subsequent suicide. The case of Syracuse illustrates that even though the majority of the inhabitants might be spared, the a city might still suffer badly.

The capture of New Carthage provides evidence for another possible "convention" of Roman warfare. Here the Carthaginian general Mago attempted to defend the citadel and only surrendered when he realized that the city had been completely overrun. Until this final surrender the Roman soldiers had been carrying out an indiscriminate massacre of the population on the orders

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[7]Razing a town seems to have been a very severe punishment, and in the cases of Carthage, Numantia and Jerusalem, the cities represented particularly strong resistance to Rome; their total destruction was probably to set an example.

of Scipio, according to Polybius. When the citadel surrendered, Scipio sounded the order to stop the slaughter and turn to plunder. Polybius claims that this was the Roman custom and was to inspire terror on the taking of a town by storm through the indiscriminate slaughter of both inhabitants and animals (X 15). In the case of New Carthage it was also no doubt intended to encourage those in the citadel to surrender. This treatment would appear to contradict Onasander's advice about showing mercy to the population if the defenders seemed likely to hold out in the citadel (xlii). However, there is a clear implication in Polybius that once the citadel surrendered, the massacre would stop and this method may have been considered as effective as the use of mercy in inducing the surrender of defenders.

The mass graves at Maiden Castle provide a vivid example of the violence of such a massacre following the assault of a fortified settlement (Wheeler 1943 351-2). Several of the skulls show multiple injuries, some of which "must have been inflicted after it was quite clear that the victim was dead". 23 adult male, mostly 20-35 years old, and 11 female skeletons are associated with the "war cemetery", with 14 of the surviving 25 skulls showing evidence of mutilation, either from sword cuts or other blows. Wheeler cites one example in particular, the skull of a young man with at least nine sword cuts as well as evidence of other blows (1943 63). Whilst the blows on some of the skulls no doubt represent the battle itself, this one, Wheeler claims, is clear evidence of the massacre.

Rebellions and Revenge

The treatment of those who had rebelled against Rome tended to differ from those of those newly conquered by the Romans. In the latter case the conquered enemy would not normally be treated too harshly, but rebels were

usually dealt with very severely pour encourager les autres. In addition, if the enemy had committed atrocities towards Romans during the course of a war, they might be treated more harshly whether they were rebels or not. Under these circumstances the distinction between surrendered and defeated towns and forces was not so great.

Thus when Numantia was forced through starvation to surrender the entire population was sold into slavery except for the few who were to appear at Scipio's triumph, and the town itself was razed to the ground. This harsh treatment was probably for a number of reasons; the Romans had taken ten years to capture the town, they had suffered embarrassing defeats during that time and, perhaps most significantly, the defenders were the last to hold out from the revolt of Viriathus in 153 BC. At Uxellodunum, Caesar wanted to make an example of the defenders to prevent further outbreaks of rebellion in Gaul (BG viii 44), so he cut off the hands of all who had carried weapons. Again, at Jotapata and Jerusalem, the massacre of the population was particularly severe because they had revolted, though also because of the difficulties of the sieges.

Tacitus makes an interesting comment on the treatment rebels could expect as well as giving several examples of their treatment; he claims that the Iceni in c.AD 47/48 fought with great bravery because they "had rebellion on their consciences" (conscientia rebellionis, Annals xii 31), and so knew they could not expect mercy. The battle resulting in the defeat of Tacfarinas' rebels was particularly bloody, though as with Numantia this was partly because the war had been a difficult one and the Roman soldiers had suffered hardships, according to the historian (Annals iv 25). The slaughter following the defeat of the Britons in the Boudiccan revolt was exacerbated by the atrocities

committed by the Britons on the inhabitants of Camulodunum, London and Verulamium (Annals xiv 35), and Agricola supposedly exterminated almost the whole tribe of the Ordovices following their brief rebellion before his arrival (Agric.18)[8].

The sources clearly make the connection between rebellion and harsh treatment, but it is also clear that revenge for atrocities could be exacted at the same time. The murder of Roman merchants at Cenabum (BG vii 3) encouraged the bloodshed following the storming of Avaricum (BG vii 17 & 28), even though that had been carried out by the Carnutes and not the Bituriges. When the individual responsible for inciting the Gallic revolt and the massacre at Cenabum was eventually captured (BG viii 38), Caesar was 'forced' by his soldiers to execute him even though he was opposed to harsh punishments. The Veneti, however, conquered by Caesar in 56 BC, were harshly treated even though they surrendered (BG iii 16), but this was because of their detention of Caesar's envoys (BG iii 8). Caesar wished to make an example of them so the Gauls would respect the rights of envoys, and executed the tribal leaders and sold the rest into slavery.

One occasion where this desire for revenge seems to have had little affect on the treatment of the defeated was at Carthage where Hasdrubal tortured and executed Roman soldiers in full view of their colleagues to destroy any hopes of surrender. Even though the city was taken by assault there was not the full scale massacre there might have been. Appian states that by committing these atrocities Hasdrubal was depriving the Carthaginians of all hope of a pardon (Punica 118), and the implication is clear; atrocities on Roman soldiers

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[8]Since they had attacked a Roman unit stationed in their territory the Ordovices can be classed as rebels.

and civilians would lead to savage treatment whether the enemy surrendered or not.

Civil War

Towns and field forces during civil wars could suffer as badly as those which rebelled. Tacitus states that troops could not be controlled as tightly during civil war as at other times (Hist.II 29; III 7), and since during a civil war money could not be made from the ransom of prisoners (Hist.II 44; Plut.Otho 14), the slaughter of fellow Romans following a pitched battle or the capture of a town could be particularly bloody[9]. Failure to control troops led to the attacks on civilians by Otho's troops on the coast of Gaul and N.Italy (Hist.II 13; Agric.7), and by those of Vitellius after their successes at Cremona (Hist.II 56).

Despite the suggestions in the treatises that the commander should control his troops strictly (Cicero Pro Leg.Man.13), this was not always the case, as at Syracuse (see above p.217). After Caesar's defeat of the Scipionic forces at Thapsus, his soldiers went on the rampage and massacred all their opponents despite Caesar's entreaties to his men to spare them (B.Afr.85). However, Caesar does not seem to have punished his soldiers in any way, suggesting that he was not particularly angry at their actions[10]. One of the most famous examples of complete failure to control troops occurred following the Flavian

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[9]Plutarch (Otho 14) mentions the huge pile of dead by a temple after the first battle of Bedriacum.

[10]Examples of strict punishment of troops following disobedience of orders concerning the treatment of the defeated are rare; Scipio executed three officers who failed to control their troops at Locha (see above p.215); Sertorius supposedly executed an entire cohort following the ill treatment of a woman during the capture of the Roman town of Lauro (Appian BC I 109), and Cassius threatened with death any soldier who plundered following the surrender of Rhodes (BC IV 73).

victory at Cremona in AD 69. The victorious troops stormed the city which had supported Vitellius and sacked it for four days, although it had surrendered (Hist.III 33-34). The Flavian commander seems to have made little effort to prevent his troops from sacking the town, though in the light of Tacitus' comment on the control of troops during civil war perhaps he would have been unable to do so anyway[11].

The treatment of captured towns during civil war varied but could also be very severe. Marseilles might have suffered badly because of the length and difficulty of the siege but when it surrendered Caesar claims he spared both the city and its inhabitants because of its antiquity and reputation. However, Marseilles was an important strategic town and it would not have been in Caesar's interests to sack the place or ill-treat its citizens, though he did leave a garrison. Political and military interests also influenced Octavian's treatment of the defenders of Perugia in 41 BC; he released Lucius Antonius, the brother of his ally Mark Antony, and so the blame for the city's opposition fell on the city officials whom he executed.

However, a general's interests could also result in the ill-treatment of towns; Gomphi in Thessaly had originally sided with Caesar but following his setback at Dyrrachium went over to Pompey, possibly under coercion. The town was rich and well-supplied and would be a useful supply base for either side. Caesar took the town by storm and allowed his men to plunder it, then paraded captives before the walls of another town that had acted similarly (BC III 80-81). Caesar intended his treatment of Gomphi to act as an example and terrify the other towns in Thessaly, and it seems to have worked because they all

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[11]Since the troops would have been unable to profit from the taking of prisoners, plunder was the only source of money from the campaign.

surrendered. These towns seem to have been in a no-win situation, forced to support the different factions. In the case of Gomphi, Caesar could perceive the inhabitants as rebels and treat them accordingly. Political and military interests, therefore, could have a significant influence on the treatment of towns in particular during civil wars, though in the case of open engagements, civil war often made the outcome as bloody as in rebellions.

Conclusions

The advice contained in the treatises and Cicero about behaviour and morality in warfare is for the most part reflected in the other literary sources. With the few exceptions in "accepted" behaviour discussed above, mercy was usually shown to those who surrendered, generals were not excessively cruel or severe and, again with a few more exceptions, troops were kept under control. It is also clear that whatever the legal formalities concerning warfare and the conduct of war, there was a series of generally accepted conventions which can be reconstructed from the range of literary sources.

Thus if a town surrendered, at whatever stage of the siege and even after the battering ram had touched the walls, the defenders would usually be treated mercifully. If, on the other hand, a town was stormed, it faced plunder and destruction, and the survivors of a massacre might face slavery. Although most evidence relates to besieged towns, there seems to have been a similar contrast in the treatment of field forces. The example of New Carthage suggests that there was a more formalized convention concerning the sacking of towns, though this may only have been applicable to towns in which resistance continued in the citadel after the capture of the town.

The exceptions to these 'conventions' occurred for the most part during periods of civil war, rebellion and for revenge, so under abnormal conditions. In civil war, because troops could not be as tightly controlled as at other times and prisoners were worthless, atrocities might be committed which would not happen under other circumstances. Tacitus states that rebels could not expect to be treated mercifully (Annals XII 31), and Appian that those who committed atrocities could not either (Punica 118). These statements are certainly borne out by the evidence and so can be considered 'conventions' in themselves.

The various 'conventions' on conduct listed above might have had some influence on the commander's treatment of his surrendered or defeated enemy, but the interests of Rome and, or, the commander himself, probably had more affect. As Paul points out (see above p.216), it was in Rome's interests to be lenient to newly conquered peoples. Leniency under these circumstances might encourage other towns or forces to surrender. On the other hand, those who resisted might be severely dealt with to serve as an example (eg: BG III 16), and this is particularly so with revolts.

By advocating the widespread use of mercy on humanitarian grounds, Cicero is probably being unrealistic. The suggestion in Onasander that brutality could be used when it was in the general's interest is far more pragmatic, and Roman commanders appear to have used brutality and leniency as a tool of conquest. Thus Caesar punished the defenders of Uxellodunum to serve as an example to all who contemplated revolt (BG VIII 44), and his treatment of the town of Gomphi (see above p.222) was also to serve his interests. His clementia, however, was well known and he used this to his advantage too (see above p.210). Corbulo and Agricola likewise applied a mixture of ruthlessness

and mercy to encourage surrender and serve as examples. By providing examples of how both terror (Strat.II ix) and mercy (Strat.II xi) could be used to bring about surrender, Frontinus perhaps best illustrates the role of morality in Roman warfare.

Conclusions

With most of the topics discussed above there is a definite and very clear correlation between the advice of the military treatises and actual field practices. This is especially evident in the advice given on the siting of marching camps and the arrangement of the marching column. Much of the advice has been shown to be realistic and therefore practicable; it would have been possible to acquire a basic military knowledge from the treatises. Thus the claim of most of the treatises to be giving practical advice is not just a literary topos as Campbell suggested (1987 19), though this does seem to be the case with the 'Greek phalanx' treatises; in many cases the claim was justified; they do give realistic and practical advice.

A concluding section follows the discussion of the individual topics considered above, and I do not intend to repeat the analyses here. Two factors in particular are clear: the strong correlation between Roman military theory as presented in the treatises and field practices, and the very conservative nature of Roman warfare.

Two of the subjects discussed above however, do raise problems; the strength and organization of units, and siege warfare. In the first case, the admittedly fairly limited information in the treatises implies a regularity in the organization of the Roman army that is not corroborated by any of the other contemporary evidence on the subject. A reasonable explanation for this would seem to be the distinction between the theoretical paper strengths of the various units, which the textbooks report, and the fluctuations to the actual unit sizes depending on circumstances since they might be left understrength in peacetime and increased to or above theoretical strength in reaction to an

emergency or in preparation for war. The evidence of Polybius and Livy indicates that Republican legions were flexible in this way, and Vegetius (II 6) suggests that this was possible during the Empire too. There seems no reason why this should not be the case for both legions and auxiliary units during the Empire.

The lack of practical guidance on siege warfare, as opposed to descriptions of siege equipment, has been discussed above, and it has been proposed that this has to do with the nature of siege warfare which was more a case of action and reaction, and the fact that techniques changed very little. Onasander is shown to be right when he states that the general "will use the various pieces of equipment as the opportunity arises and ... this depends upon the luck ... and the power of the combatants, and the skill of the military engineers" (xliii).

Evidence for the actual use of treatises is a problematic area and raises the 'chicken and egg' question; do the treatises reflect actual field practices so strongly because they are simply describing contemporary or past procedures, or did commanders follow their advice, as the writers seem to imply they should, and so the field practices reflect the advice of the treatises?

Certainly there is evidence that implies treatises could and indeed would be used under certain circumstances; Vitruvius states that there were textbooks on siege warfare (which fortunately Rome's enemies did not use; de Arch.X xvi 2)). Caesar (BG II 22; VI 34) states that one could follow the textbooks of military institutions and standard practices, and perhaps hints at a little criticism of these in BG II 22 for their rigidity when he says that his troop deployments were "dictated more by the topography of the site, the slope of

the hill and the demands of the immediate situation than by the theories of any military textbook"[1].

Onasander seems to be aware of the dangers of too rigid a textbook. Whereas Vegetius provides fairly inflexible advice, that of the earlier writer is not. He is prepared to provide the basic instructions but leaves it to the general himself to add the details depending on the individual situation, because of the number of variables in play. Like Caesar, Onasander was aware that the immediate situation, the topography and the nature of the enemy would have more influence on dispositions than anything he might say in his treatise (xv), and the general must resolve the situation himself (xxxii). He does admit that "things... cannot be reduced to rules or planned beforehand" (xxxii), and so is aware that his textbook alone is not sufficient; experience and insight are also necessary.

Polybius (XI 8) claimed that there were three ways to learn the art of generalship; through exempla, treatises and practical experience. Whilst there might be a place for military treatises in the education of potential officers and generals, as Polybius, Caesar and Onasander imply, and one could pick up the basics from the treatises, these alone were not enough, and this is why Onasander takes his reader to a certain point and then leaves it up to the individual.

A lot of the advice given in the treatises is fairly obvious common sense, but a large part of ancient warfare was a matter of common sense. Since the

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[1]The "Fighting Instructions" of the 18th century Royal Navy were similar. According to the Enclyclopaedia Britannica, they provided valuable instructions based on sound principles, but limited the opportunities for tactical skill (Enclyclopaedia Britannica 1962, vol.16 272).

treatise writers wished their treatises to be comprehensive, they did point out the obvious, such as camping on raised ground near water and not overlooked or near gullies, or anchoring a wing of a battle line on a natural obstacle to hinder or prevent outflanking manoeuvres. These are fairly obvious schemes but potentially very important, so they had to be included in a textbook on warfare.

The textbook general

Let us consider briefly the actions of the 'textbook general' of the early Empire, an ideal commander created from the pages of the various manuals discussed above.

Having gathered his army and received intelligence, the general will set out. At night he will personally decide where to pitch camp, on rising ground away from gullies and forests, and not overlooked by higher ground. The camp will not enclose any marshy ground but will be within easy reach of a river. It will probably face in the direction of tomorrow's march, towards the enemy. The strength of the camp defences will depend on the proximity of the enemy. If the area is secure the general may decide on a simple palisade or a ditch. If not, he will order a rampart six feet high and eight feet wide, topped by a palisade, and a ditch three feet deep and five wide. Since his textbook advises him that it is better to be safe than sorry, he prefers the latter. The size of the camp is proportionate to the size of his army.

The following day the general sets off after his enemy. He sends scouts ahead to reconnoitre, and these are followed by the mass of his army. At the start of his campaign, intelligence reports no sign of the enemy so his marching column is fairly long, though he does ensure there are cavalry at both van and

rear, and the legions and baggage are in the centre with himself. The general occasionally rides up and down the marching column ensuring everything is in order, encouraging and admonishing his men when necessary and punishing those who fall out without permission.

When his scouts report the enemy are nearby, or there is danger of an ambush, the general orders his army to continue the march in an agmen quadratum, a more compact formation with cavalry flanking the legions, baggage and auxiliary infantry. Having already considered his potential line of battle, the general has ensured that there is a close correlation between these two formations so the army can deploy from one to the other with minimal delay. The general himself rides in the centre of the column, surrounded by his equites singulares, and with auxiliary cavalry on the flanks.

Once the enemy accepts a pitched battle, the general will make various preparations before engaging: he orders the construction of a marching camp, having first chosen the site for it himself, and studies carefully the enemy's dispositions and the topography of the battlefield. If the latter is unsuitable, he will not engage, or will employ a stratagem derived from his book of exempla, or made up himself.

The general deploys his army according to his strengths and weaknesses and those of the enemy, possibly anchoring one wing of his battle line on a hill or a river. He ensures that his line is deep enough to prevent it being pierced by the enemy, and long enough to prevent a flank attack on his unsecured wing. The legions are situated in the centre of the line, formed up in a duplex or triplex acies, flanked by the auxiliary infantry, and the cavalry on the wings. Since one wing is anchored by a natural obstacle, he may strengthen

the other wing in the hope of outflanking the enemy. He will retain some reserve forces in the rear.

After addressing his troops he will tell them to get on with it. His textbooks will give him no further guidance on fighting pitched battles. The general himself will command his army from the rear to avoid being killed or wounded, but will ride around encouraging his troops and sending in reserves when and if necessary. When the enemy is defeated (for a textbook general of the early Empire, this is virtually the only possible result), the cavalry will pursue the fleeing enemy while the infantry may advance, still in battle formation, in case the enemy turn and renew the fight.

Should the general find himself besieging his enemy (textbook generals of the early Empire are not themselves besieged), he can use his manuals to learn what devices and machines may be used, and how the besieged might counter them, but he will have to decide how to use these machines himself.

For the most part the textbook general will show mercy to his defeated enemy, as long as it is in Rome's (or his) interests to do so, and the enemy has not committed any atrocities against Romans. If the enemy had rebelled, he may treat them harshly to teach them, and others, a lesson.

By following the advice of his textbooks, the general might conduct a successful campaign, provided, among other things, that his enemy behaved in a fashion that the military theorists expected.

Use of treatises

Campbell (1987 24) was concerned about evidence relating to the practical use of treatises; he argued it would be impossible to say for certain whether a general using a particular tactic or stratagem had read or was influenced by military theory or previous exempla. However, I believe it does not matter even if true that it is impossible to argue for the actual use of treatises; we know from Caesar and Vitruvius that they could be used to a certain point. Unless a manual is advocating a new technique or theory, like the de munitionibus castrorum, it is undoubtedly going to reflect current practices. Onasander, Frontinus and Arrian are not trying to introduce new techniques; they are simply writing textbooks describing and explaining current field practices (and past practices in the cases of Frontinus and Arrian). Since Roman warfare was a very conservative enterprise anyway, field practices and therefore the advice in the treatises would have changed very little. The most notable changes in field practices, the use of auxiliaries as the principal striking force in pitched battles and the supposed reintroduction of the Greek style phalanx, have been shown to be strategies used because of particular topographical circumstances or because of the nature of the enemy, and these are precisely the variables that Onasander admits treatises cannot cover.

Despite the limitations of the treatises in only going so far with their advice, they provide a great deal of valuable information concerning basic field practices. A mediocre general might get by with this essential knowledge and the advice of his officers; a great general, as Caesar was aware and Onasander implies, would know when to move beyond the recommendations of textbooks and trust to his own experience and inspiration.

Appendix 1: Translation of the De Munitionibus Castrorum[1]

1. We will now explain the way in which the cohorts described above pitch their tents. One tent occupies ten feet; this length is increased by two feet for the pitching, and it shelters eight men. A complete century has 80 soldiers, so there will be ten tents which will run in a line 120 feet long. Because the width of the hemistriga is 30 feet, 10 feet are assigned to the tents, 5 feet to the weapons and 9 feet to the pack animals. This makes 24 feet; twice this is 48 feet. So when two centuries camp opposite each other, a strip (striga) of 60 feet will be made; there remains 12 feet which will provide sufficient space for those coming and going. This space is calculated for a complete legionary century. Since 16 men from each century are on guard duty at any one time, they do not pitch more then eight tents per century. In this way their centurion has a place to pitch his tent on the same area as those tents would have been. Otherwise it would have been necessary to allocate more space.

2. Because they are the most trustworthy of the provincial units, the legions should camp next to the vallum, to guard it and by their number to hold inside a human wall the army raised from foreign tribes. However when there are more reinforcements (non-legionary troops), when it is necessary to increase the allocation to the cohort, the width of the hemistriga is retained, the area remains unchanged, and we will alter the following: the area which was 120 x 180 feet will be 90 x 240 feet according to the diagram below, or 60 x 360 feet, as is also shown on the diagram. For one cohort occupies a space of 30 x 720 feet. Now, whenever the width is doubled, the length is lessened by the same proportion. But if we receive more legions and fewer reinforcements, as it will be necessary to camp the cohorts more tightly round the ramparts, we will alter the site thus: that which is assigned to the standards will be at the far end, and we will not change the method of pitching tents in hemistriqae. We have attached a plan of the arrangement below. Sometimes it is customary to assign an area 150 x 150 feet to a cohort, but although this can be done, it should be avoided, because the centuries cannot pitch their tents in the usual order and in one corner the area of the cohort's allocation will be left uncovered, as indicated below on the diagram.

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[1]This translation is based on the 1977 Teuber text of Grillone and the 1979 Budé text of Lenoir.

3. The first cohort camps inside the via sagularis because of the standards and eagles and, as it is of double strength, it will have a double assignment of space; for example, 120 feet for the lines, 360 feet for the camping space, or 180 feet for the lines and 240 feet for camping; the arrangement of the plan will be the same for the other cohorts. Therefore if there is an uneven number of legions to be camped, in this case three, two of the first cohorts should pitch camp on the sides of the praetorium in a line next to the via sagularis, and the third in the praetentura also on the sides of the via sagularis, on the left hand side as one is entering through the porta praetoria; one cohort camps on the right, opposite it so that the army can be led out in its usual order.

4. However, when there are five or six legions, two first cohorts should camp on either side of the praetorium and two in the praetentura above the hospital tents, then vexillations (or a second cohort). If the situation calls for it, a quingenary infantry cohort may be placed instead of the vexillations, and if the space is even more restricted, it should be assigned to a legionary cohort, but this should be calculated exactly, so that 120 feet are assigned to the hospital and other departments which camp above (the first cohort), namely the veterinary hospital and the workshops, which ideally should be placed at a distance from the hospital so that there may be peace for those convalescing in the hospital. The area assigned to each of these departments is usually calculated as that for 200 men.

5. Legionary vexillations should be assigned the same space as a legionary cohort, which is calculated at 600 men, because of their baggage. They should camp above the praetentura or on the sides of the praetorium as stated above, above the first cohorts. If possible, they ought not to camp near to the rampart, because their legate would not be of equal rank and if the rampart happened to be overrun by the enemy, the legion and its legate will allege that the vexillations there are responsible.

6. The Praetorian cohorts should camp on the sides of the praetorium and should be assigned a double space because they use larger tents. The primipilares and re-enlisted veterans should also be assigned a place in the same area.

7. The Praetorian cavalry should camp on the right side of the praetorium, the emperor's equites singulares on the left. If there is a greater number of the latter, for example 600 equites singulares and 300 Praetorians, 150 of the equites singulares should camp in the lines of the Praetorians. It should be so arranged that there is an equal number stationed on each side and the decurions and other principales who have two horses each, will have more room to camp. If the number is less and there is enough room in the hemistrigae for 100 cavalry there should be no hesitation in assigning the area to the headquarters staff who are nearest there on the left side.

8. If there should be an uneven number of Praetorian cohorts, Praetorian cavalry are camped in place of one of the cohorts, since the number and arrangement of the cohorts on the right and left sides of the praetorium should be the same. If the equites singulares should number 800 or 900 they should camp in equal numbers and in complete lines on either side of the praetorium; if they number about 500 one line will be sufficient for them.

9. We must be particularly careful that not more than 720 feet is assigned to the length of the praetorium. Thus the Praetorian cohorts and the other unit which camps on the side of the praetorium will be assigned complete lines in a very satisfactory way. For although 140 to 220 feet may be assigned to the total width of the praetorium, 720 feet must be assigned to the length, as stated above. 20 feet of the length of the praetorium should be given to the guard post but if necessary ten feet is enough.

10. In the same way an area from 50 to 70 feet can be assigned to the companions of our emperor, and in this area a space should be assigned to the Praetorian Prefect immediately adjacent to the via Principalis. Then when a road has been inserted, the Praetorian cohorts and the rest of the units should be assigned space proportionately as we have indicated in our pamphlet.

11. The altars are set up at the end of the praetorium; we will assign the auguratorium to the right side of the praetorium next to the via Principalis, so that the general can observe the omens there correctly; the tribunal is set up on the left side, so that having observed the omens, the general can ascend the tribunal and address the army on the favourable auspices.

12. At the entrance to the praetorium and in the middle next to the via Principalis is the spot named groma, called this because the troop assembles here or because when the measurements are being fixed the iron-footed groma is put over the same place, so that by sighting from this point the gates of the camp form a star. For the reason written above, those who practise this technique are known as gromatici.

13. Access roads are provided running parallel to the via Sagularis so that the army can advance quickly for a sortie.

14. I will now describe the arrangement of the praetentura. The via Principalis, which runs between the right and left gates, and which gets its name from the principia, should be 60 feet wide, the same width as the work which separates the vallum from the legions and for this reason it is known as the intervallum. Likewise the road which leads to the porta praetoria (the via praetoria is no doubt named after the praetorium) should be 60 feet wide, as stated above, and because of the orientation of the tents, the lines situated above this in the praetentura should not run parallel to it, since the standards should look down the via praetoria.

15. And so below the via Principalis we will assign the legates their space, which is termed scamnum and does not have the fixed measurements of the common lines because the number of legions is variable; but a space of 50 to 80 feet wide should always be kept for it, according to the number of legions present. The tribunes of the Praetorian cohorts usually camp in this area. In the same way an area below this should be assigned to the legionary tribunes, which is similarly termed scamnum. Separated from these by a road are the milliary or quingenary alae one after the other; we have shown below on the plan how each unit should camp.

16. As I have come to a suitable point, I will now describe the milliary ala. It consists of 24 turmae, in which there are decurions, duplicarii and sesquiplicarii, one of each in every turma. The decurions each have 3 horses, the duplicarii and sesquiplicarii 2. Thus there are 96 horses over the 1000, which is the number calculated when the extra horses are discounted. A quingenary ala has 16 turmae, decurions and other NCOs and so there are 64 additional horses. For this reason 3 feet are calculated for each trooper; their

number is established at 1000 so that the prefect of the ala can be assigned an area in the space and their principales can camp in a more spacious way; for the rest, each trooper is assigned 2½ feet.

17. This, however, concerns the retentura: the road above the praetorium, through the extension of which, when the army is larger, ie: 5 or more legions, the portae quintanae are usually placed, should be made 40 feet wide; if the gates are placed there it should be 50 feet wide, and it is known as the quintana because of the forces.

18. The quaestorium is so called because the quaestors were sometimes assigned their places there; this is above the praetorium in a line with the gate called decumana because the 10th cohorts camp there. The quaestorium should be narrower than the praetorium so that the lines of the guard will be immediately behind the praetorium. In particular, the enemy's ambassadors and hostages should camp there, and if any booty has been captured, it is placed in the quaestorium.

19. The centurions of the guard should camp on the sides of the quaestorium close to the via quintana so that the rear of the praetorium is protected and they are right next to the praetorium; we will assign a double space to them because they use the same tents as the Praetorian cohorts. A quingenary infantry or part-mounted cohort should be placed above these, because of the size of the line. Infantry or part-mounted cohorts should camp in the other lines, looking towards the via quintana; the allies and other allied tribes should camp above these; it should be arranged in such a way that the allied tribes are held in all sides, as stated above.

20. 30 feet will be wide enough for the via sagularis; if there are five legions, however, it ought to be 40 feet wide. The offices of the first cohort, where the orders are given to the legion, should be placed in the scamnum of the legates opposite the eagle.

21. As far as possible, the camp should be 3 x 2 in proportion so that a blowing breeze can refresh the army. I said above a 3 x 2 ration, for example, 2400 feet long by 1600 feet wide. If it is longer the trumpet call can be

sounded, but in a disturbance the horn cannot be easily heard at the porta decumana; if it is wider, the outline is too near being a square.

22. I think we have dealt carefully enough with everything that is necessary, and if explanations on some matters become necessary, I will deal with them in their place. In addition, lest I seem to be passing over the fortifications of camps, the choice of site, the fixing of measurements and the art of avoiding unfavourable sites, I will deal with them briefly at the end.

23. Meanwhile, I will explain the beginning of measuring and we shall review the units to be placed in the plan. We will also advise on where they should camp. The Praetorian cohorts and cavalry, the emperor's equites singulares and the milliary or quingenary alae should camp on the sides of the praetorium if the space permits; then vexillations and second cohorts or quingenary infantry units above the first cohorts.

24. Milliary or quingenary alae, Moorish cavalry and Pannonian light horsemen camp in the praetentura. All the marines camp there as well because they are the first to go out in order to construct roads, and so that they are safer whilst working, they are protected by the Moorish cavalry and Pannonian light horsemen; they should camp next to the cohorts. In the same way the scouts should camp in the line of the first cohort just like the legionary vexillations.

25. The milliary or quingenary part-mounted units camp in the retentura; I have explained their organization below. Each provincial (auxiliary?) soldier is assigned one foot plus a fifth of the total length of the hemistriga; each cavalryman however receives 2½ feet and the fifth. Now when we have received the units, in order to calculate the area of the retentura, we transform, as it were, the part-mounted units into infantry units so that we can assign the space to the cavalry with their cohorts more easily.

26. So a milliary part-mounted cohort has 240 cavalry which I shall transform into infantry, and to which I shall assign the 1 foot the infantryman gets and the 2½ feet which is assigned to the horse. Then, taking half the number, it should be multiplied by five. We will deal with the number of cavalry in this way; this makes 120, multiplied by 5, this is 600. Therefore minus the cavalry, 760 feet is assigned to the remaining infantry of the milliary part-

mounted cohort; added to the above number, the total is 1360. So let us remember that a space for 1360 men should be assigned when calculating the space for a milliary part-mounted cohort.

27. A quingenary part-mounted cohort contains the same organization but half the numbers of a milliary part-mounted cohort. So a milliary part-mounted cohort has ten centuries of infantry, 240 cavalry, (?)turmae and ?6 decurions; they camp in 136 tents and from this number, the centurions and decurions use one each. A quingenary part-mounted cohort has 6 centuries, and half the rest of a milliary unit.

28. A milliary infantry unit has ten centuries and camps in 100 tents, of which the centurions use one each. In the same way a quingenary infantry cohort has six centuries and the rest of its organisation is as above.

29. We will place the tribes, Cantabrians, Getuli, Palmyrenes, Dacians, Britons, the centuries of guards and any others among the allied forces, in the retentura. We will assign five feet to each of the camels with their drivers. If they are to be used against the enemy they should camp in the praetentura next to the marines, but if they are there to carry booty, they should camp in the quaestorium.

30. And so we may calculate the numbers of the units which I have listed above: 3 legions, 1600 vexillarii, 4 Praetorian cohorts, 400 Praetorian cavalry, 450 of the emperor's equites singulares, 4 milliary alae and 5 quingenary; 600 Moorish cavalry, 800 Pannonian light horsemen, 500 marines from the fleet at Misenum and 800 from Ravenna; 200 scouts, 2 milliary part-mounted cohorts and 4 quingenary; 3 milliary infantry cohorts and 3 quingenary; 500 Palmyrenes, 900 Getuli, 700 Dacians, 500 Britons, 700 Cantabrians and two centuries of guards.

31. After receiving the numbers we should always do the calculations for the retentura so that we know how many hemistrigae to put up in each half of the retentura. Now, the number that will camp in the retentura is 13640. The number is halved, so that an equal number camps on each side, that is 6820. Now we shall organize the sides of the praetorium and calculate likewise for the

praetentura just as we did for the retentura so that we know where we should assign space for the tents and standards of the legionary cohorts.

32. So we should notice that when 3 legions with their reinforcements are to camp, the half part of the camp is 720 feet wide and we assign 90 feet for the tents and 240 feet for the standards on the sides of the camp to the cohorts so that, having deducted the space for the cohorts and the width of the via sagularis, 600 feet remain. Thus milliary alae should camp in an area of the praetentura. Now to establish the assignments for the rest of the 600 feet space, we shall fill one side of the praetorium so that we know how many alae may camp in the praetentura.

33. 420 feet on the side of the praetorium is occupied by units of soldiers, 60 feet by the Praetorians, 20 by the guard picket, 60 feet by the emperor's companions and 40 feet by the roads; this is approximately the distribution on this side of the praetorium; that is 600 feet.

34. Now to organize the praetentura we must compute the number of cavalry from alae which are left. This is 4000, half of which is 2000. A milliary ala should be assigned 150 feet for the standards and 600 feet for the tents. By this method 150 feet makes 5 hemistrigas. A cavalryman is assigned 3 feet in a length of 600 feet; I will take a third of this so that I have the number of cavalry who will camp in the length; that is 200 so this will be one hemistriga. And now we calculate 5 hemistrigae; 5 times 200 is 1000, the correct space for a milliary ala.

35. However, we must calculate the remainder of the force, as on the retentura, so that we know similarly how many hemistrigae should be set up. This number together with space for the hospital, veterinary hospital and workshops, which are calculated together at 600 men, is 8000. Half of this is 4000; this will be the number of half the part; it is 600 feet wide, which will hold 500 men; as we have said, an infantryman receives 1 foot and a fifth. So there is no difference between adding a fifth part to the number that has been calculated and taking away a 6th part, in this case 600 feet. There remains 500 which is the number of men held in a hemistriga.

36. But we have a force of 4000; we may see how many times 500 I have; it is 8. This is the number of hemistrigae to be made. This makes 240 feet, and the assignment of the alae calculated above was 300 feet, making a total of 540. 3 cohorts can pitch their tents here which will take up 720 feet from which the amount the unit occupies is subtracted, that is 540 feet; there remains 180 feet in which 6 hemistrigae can be set up. Like the one above the 1st cohort, access roads are made in the same way for the units, each one being 4-10 feet. 60 feet is assigned for the roads. This leaves 120 feet which we assign to the tents of the tribunes and legates at the rate of 60 feet each.

37. Now if the surveyor assigns to the place 1000 extra men in the same area, we will have the following. Since half of this is 500, which is assigned to a hemistriga, we deduct 10 feet from the scamnum and build a road between the alae, which is given if the space permits. There will be 30 feet; this will be a hemistriga which will be assigned to the remaining 500 men.

38. Now on the opposite side in the same way we deduct from the total force 1000 men whose lines will be in a space of 60 feet. We will assign 80 feet to the scamnum of the legates, 70 feet to those of the tribunes and place roads between the alae.

39. It is the same for the sides of the praetorium and retentura, if there should be a greater or smaller force, and we also look out so that we increase or decrease the area of the praetorium and allocation to the emperor's companions, and likewise for the quaestorium, so that the proportion of the width of the camp is retained. If, however, the space is more restricted, the roads between the Praetorian cohorts and cavalry units can be left out because if they observe military discipline, as I stated above, the soldiers will each gather in their own units.

40. In the retentura the men are accustomed to camp 50 per line closely or more widely, and since it happens that the units often change, they may have to pitch more tents although the lines run in the same area. No more should be taken away from these except quingenary infantry cohorts above the first cohorts and if there should be more units, but not enough to fill a line, it will be necessary to camp more closely in the remaining lines, as stated. Similarly it should be organized in such a way that they camp more spaciously whenever

the remaining numbers permit so that the organisation of all the measurements is not thrown into confusion. So that they may camp in the lines of the retentura in equal numbers, it is useful if the numbers in the retentura have already been calculated, as in the case of the praetentura.

41. If there should be more or fewer reinforcement troops than we have shown, everything changes and the cohorts camp round the rampart in a different way.

42. Now we have spoken about the 6820 troops in the half-part of the retentura. As this is 600 feet wide, I will see how many hemistrigae there can be. In the present case this will be 17 and enough space can be assigned to the quaestorium. And so I take a 17th part of the force which is as we have said, the number of hemistrigae. This is 400, and so this will be the number of soldiers. They should camp in one hemistriga plus a fifth part of the length which is 80 feet; so this makes 480 feet from which it emerges that two cohorts camp on the side of the retentura.

43. We should distribute the allies and other tribes in the lines, but they should not be in more than three groups, nor far from each other so that they can hear the watchword in their own tongue more quickly. We should observe that the standards are assigned the first line, the same as those of the first cohorts, so that the access roads can run through the camp.

44. There will be 16 legionary cohorts along the sides, 6 in the praetentura and 4 in the retentura, each one being assigned 60 x 360 feet; the other four cohorts camp inside the via sagularis.

45. As far as I am able, brother Lord, on account of my inexperience of military affairs, I have followed briefly all the authors and whatever they wrote about the organization of summer camps, and I have explained everything in a logical system in this pamphlet before arranging the troops. To this day no author has explained in written instructions all the measuring from the beginning, and because of this I hope that our care will be rightly approved by you.

46. So we have explained the disposition of the legions and assigned the whole army to their places; we have also shown which units should be moved if necessary. If the alae should be placed in the retentura and infantry or part-mounted cohorts in the praetentura for no particular reason, it is without doubt a sign of an inexperienced surveyor. It is obvious that if there are no part-mounted cohorts at all in the army, we should place quingenary alae on the sides of the quaestorium so that the retentura has some cavalry.

47. It concerns the arrangement of the legions and the division of the units, it shows the difficulties even to those skilled in camp organization relating to the number of legions. So if you should condescend to use it I will be the first to carry to your magnanimity this new method of measuring which I hope will please you if you first examine the usual method of measuring.

48. Now we shall deal briefly with the fortifications of camps and other matters on which a number of authors have written. Five types of fortification of summer camps may be noted: ditch, rampart, stakes, stockade and weapons.

49. In a more secure place, the ditch is used for the sake of discipline, and the types are V-shaped or Punic. It is called V-shaped when the sides, sloping in from the top at the same angle and becoming narrower, reach the bottom. A ditch is Punic when the outer side is laid out vertical; the other side is inclined as in the V-shaped. They should be at least five feet wide and three feet deep. A similar ditch should be dug 60 feet in front of the gateway, and the same width as the gate. Because of its shortness, it is known as a titulum.

50. In less secure places a rampart of turf, stone, rocks or rubble should be thrown up. Eight feet wide and six feet wide will suffice, and a little parapet. There should also be a rampart before the gates along the titulum as along the ditches; because of the construction it is known as "sanctum".

51. The stakes are trunks with their branches. They are resorted to if the nature of the soil is too friable causing the turfs to break, if a thick enough rampart cannot be built because of the looseness of the stones, or if a ditch cannot be dug without the sides collapsing.

52. When there is a shortage of stakes and the place is insecure, they protect the camp with four rows of armed men so that in each row guards are stationed frequently; cavalry should make a circuit of the camp by turns. If the camp is in a peaceful country, one row of arms will suffice for the sole purpose of maintaining discipline, and the guards are stationed more widely.

53. However, the same happens with the stockade as with the rampart if the place is rocky or sandy, because without doubt a stockade provides sufficient fortification for a camp.

54. The angles of the camps should be rounded because they make the projections and weaken the work which protects the defences. They should be rounded from the angle of the cohorts which make the sides of the work 60 feet and until the line rejoins the outside line of the rampart, and this makes an angle of 90°.

55. In the same way the clavicula is traced round a circle from a line on the inside of the rampart from a point in the middle of the gate, the compasses wide open to the edge of the gate; from this centre point you draw an arc in front of the road following the same line which is fixed at the centre of the gate. Then with the compasses in the same place you add the width of the rampart and draw another arc on the same line so that those going in are always unprotected and those coming in a straight line are kept out; and it gets the name clavicula from this effect.

56. Concerning the choice of terrain for the establishment of the camp; first they choose a site which rises gently above the plain, on a distinctive rise and the porta decumana is set at the highest point so that the area is dominated by the camp. The porta praetoria should always look towards the enemy. The second place is situated on a flat plain, the third is on a hill, the fourth on a mountain, the fifth in whatever place is necessary, from which it is called an "unavoidable camp".

57. It should be particularly noted that a road should be built which is longer than the sides of the camp. Whatever the position of the camp there should be a river or spring on one side or the other. Unfavourable positions, which were called mothers-in-law by our ancestors, should be avoided at all times:

the camp should not be overlooked by a mountain from which the enemy could attack or see what is going on in the camp; there should be no forest nearby to conceal a hidden enemy, nor gulleys or valleys through which the enemy may secretly approach the camp; nor should the camp be near a fast-flowing river which might flood and overwhelm the camp in a sudden storm.

58. In hostile territory one must remember to construct numerous double width access ramps up to the rampart and to build artillery platforms around the gates, on the projections at the corners and in places on towers. In particular the rampart should be fitted out with artillery on any side which is a mother-in-law if this cannot be avoided.

Appendix 2: Catalogue of Pitched Battles of the late Republic and Early Empire.

This catalogue contains only precis of pitched battles in the late Republic and Empire discussed in chapter 6; it does not include skirmishes or minor cavalry engagements outside pitched battles. The various sources have only been used when they make some contribution to understanding the dispositions and tactics involved.

Caesar vs Helvetii 58 BC — BG I 24

The Helvetii attacked the Roman rearguard on the march; Caesar withdrew his troops to a nearby hill and sent his cavalry to check the enemy attack.
C. drew up his four veteran legions in a triplex acies. His two newer legions and all the auxiliary were drawn up on top of the ridge where entrenchments were dug to protect the baggage train.
The Helvetii drove back the Roman cavalry, formed a phalanx and advanced.
The Romans threw their pila from higher ground, easily breaking the phalanx, then drew their swords and charged. The Helvetii were driven back.
The Boii and Tulingi attacked the Roman right; the rear cohorts of the battle line turned to deal with this assault while the front two lines defeated the Helvetii.
The Romans captured the Helvetii's camp and the Helvetii fled.

Caesar vs Ariovistus 58 BC — BG I 50

Caesar formed his troops in a triplex acies with a legate or quaestor in command of each legion. The auxiliaries were left guarding the small Roman camp.
The Germans were formed up in a massed phalanx and C. took station on the right wing, to face the weak German left.
There was no time for throwing pila because of the suddenness of the German charge.
The German left was defeated and put to flight but the right was pressing hard on the Roman left.
Crassus, the cavalry commander, noticed this and as he could move more freely than the other officers who were occupied in the line of battle he ordered the third line in support of the Roman left.
The Germans fled, pursued by the Roman cavalry.

Caesar vs Belgae 57 BC BG II 8ff

Both sides had camped, Caesar on a hill suitable for drawing up his battle line.

C. had trenches dug from his camp at 90° to his proposed battle line. Fortlets and artillery were sited at the ends of these trenches to prevent his right wing being outflanked.

The two novice legions remained in camp; the six others were drawn up before the camp, but C. gives no details about the battle line.

In a cavalry engagement, the Romans come off better. C. engaged with his light armed Numidians, slingers, archers and cavalry to prevent the Belgae moving against the Remi.

The cavalry pursued the survivors and the following day attacked the Belgic rearguard.

Caesar vs Nervii 57 BC BG II 20

Caesar's army was approaching the enemy so he had his line led by six legions in light marching order, then the baggage train, then the two novice legions as rearguard.

The six legions began entrenching camp.

The light troops and cavalry engaged the Nervian cavalry and forced them to retreat, but their infantry then charged C.'s cavalry and threw them into disorder.

Nervian infantry attacked the entrenching legionaries. These were separated by thick hedges and the soldiers joined the nearest standards.

The Roman left and centre were successful but the right wing was in danger of being surrounded. The Roman cavalry and light infantry were driven off again.

C. went round his legions encouraging them, then joined the right wing which was in difficulties.

With the arrival of the two novice legions and the Xth from the successful left wing the tribes were driven off, suffering severe casualties at the hands of the pursuing cavalry.

Crassus vs Aquitani 56 BC BG III 24

Crassus formed a duplex acies with the auxiliaries massed in the centre because he had no great confidence in their fighting abilities.

Labienus vs Gauls 53 BC BG VI 8

Labienus enticed the Gauls into a poor position.
No details of his battle line, but the cavalry were posted on the wings, and to protect the baggage train.
The Gauls were routed as soon as the lines met.
The pursuit was carried out by the cavalry who killed and captured many.

Labienus vs Parisii 52 BC BG VII 62

No details of the Roman battle line.
The Roman right drove back the enemy left but there was resistance on the enemy right where the Parisian chieftain was stationed.
The victorious Roman right attacked the Parisian rear and slaughtered them.

Caesar vs Bellovaci 51 BC BG VIII 14

Caesar formed up his legions in front of the hill on which the Bellovaci were positioned and set up artillery.
The Bellovaci did not attack, so C. ordered 20 cohorts to entrench camp.
When the camp was complete, C. lined up his troops with the cavalry on the wings.
The Bellovaci withdrew behind a smoke screen.

Caesar vs Afranius 51 BC BC I 81-3

Caesar wished to avoid battle for the moment but Afranius drew up his battle line to prevent further work on C.'s fieldworks.
Afranius drew up a duplex acies with two lines of five legions; his third line, of reserves, was composed of auxiliaries.
Caesar used a triplex acies in 4-3-3 formation, with archers and slingers posted in the centre and cavalry on the flanks.
There was no engagement; because of the confined area of the battlefield, a routed enemy could easily attain the safety of his camp and therefore any battle would be indecisive.

Curio vs Publius Attius 49 BC BC II 34

Both sides were eager for battle and drew up their lines with a valley between them. Each waited for the other to attempt to cross the valley so they could join battle in a more favourable position.
The cavalry and light infantry from Attius' left wing began to approach.

Curio sent his cavalry and two cohorts of Marrucini to meet them.
Attius' cavalry fled, leaving the exposed infantry to be surrounded and massacred.
Taking advantage of the enemy's low morale, Curio ordered his troops to attack. Attius' troops fled.

Curio vs Saburra 49 BC — BC II 40-2

Saburra ordered his troops to feign retreat, enticing Curio down onto level ground.
There are no details of battle lines.
Saburra attacked first with his cavalry which began to outflank Curio's troops and attack them from the rear.
Cohorts which advanced beyond the battle line were quickly surrounded and cut off by the much faster light armed Numidians.
The whole force of Curio was pinned down by cavalry and massacred.

Pharsalus 48 BC — BC III 88-99; Appian BC II 75 ff

Pompey's line: Triplex acies, according to Appian. Pompey was on the left wing with two legions; Scipio in the centre; strongest troops on the right. The right wing was protected by a stream with steep banks so he placed all his cavalry, archers and slingers on his left. Appian suggests that many of Pompey's auxiliaries were stationed outside the line of battle to attack Caesar's flank or camp.
Total of 45,000 + 2000 veterans.
Caesar's line: Triplex acies; Xth legion (his most reliable) on the right wing with Sulla, the depleted IX and VIII on the left with Antony. The remainder of his troops were in the centre with Domitius. C. took up position opposite Pompey, with the Xth, according to Appian.
After observing P.'s dispositions, C. took one cohort from each legion's third line and formed them into a fourth line (quadruplex acies) on his right opposite P.'s cavalry. He also placed 3000 of his bravest infantry in ambush on his right wing with orders to lunge at the faces of the cavalrymen (According to Appian, though this might actually refer to the fourth acies). Appian states that Pompey transferred some of his best cavalry to his left wing to face the Xth legion.
Total of 22,000 men.

Pompey ordered his troops to stand fast while Caesar's charged. The latter noticed this and stopped to catch their breath before renewing the charge. Both sides threw their pila then drew swords.
P.'s cavalry charged and his archers rushed out, forcing C.'s cavalry to withdraw. P.'s cavalry pressed more closely to attack the right wing's flank. C. sent in his fourth line which repelled P.'s cavalry, leaving the archers and slingers exposed. The fourth line massacred these before surrounding Pompey's left wing and taking it in the rear.
C. then sent in his third line which was fresh. The Pompeians turned and fled, though Appian describes it as an ordered retreat.
Because of his troops' high morale and the enemy's panic, C. ordered his men to storm P.'s camp. This was fiercely defended but taken.
Later C. intercepted P.'s retreating troops and cut them off from water supplies with an earthwork.
Pompey's troops surrendered.

Domitius Calvinus vs Pharnaces 48 BC B.Alex.38-40

Pharnaces dug two straight trenches 4 ft deep and not far apart from the town of Nicopolis to the point he had determined as the limit for deploying his troops. He drew up his line of battle within the trenches and the cavalry on the flanks, outside them.
Domitius stationed his Roman legions on the wings and the two provided by Deiotarus in the centre with a very narrow front. The remaining cohorts were posted as reserves.
The Roman right drove off the cavalry on Pharnaces' left and began attacking his infantry in the rear.
The Roman left attempted to surround Pharnaces' right but was pinned down trying to cross the trench.
Deiotarus' legions in the centre were defeated.
The victorious Roman right was forced to form a circle and withdraw to high ground, suffering only very light casualties.

Zela (Caesar vs Pharnaces) 47 BC B.Alex.74-6

Both sides held positions on opposite sides of a valley.
Pharnaces made a surprise advance up the steep slope against an unsuspecting Caesar. His troops were caught entrenching and had to form up line of battle in a sudden.

Pharnaces attacked with scythe bearing chariots, throwing the disordered Romans into confusion.
The chariots were driven off by missiles but Pharnaces' infantry then attacked.
The Romans were greatly helped by the nature of the ground (they were facing troops climbing uphill).
The right wing began forcing Pharnaces' troops back down the hill and the left and centre followed.
Pharnaces' troops were thrown down the hill and Caesar's, exhilarated by their success, charged up the slope and captured Pharnaces' camp.

Ruspina (Caesar vs Labienus) 46 BC B.Afr.13-18
Labienus' line was very long and closely packed cavalry interspersed with light infantry and dismounted archers.
Caesar, believing the line to be infantry, deployed in a simplex acies as best he could in view of his small numbers. He posted his archers at the front of the line and cavalry on the wings to ensure he was not outflanked.
Labienus' cavalry on his wings threatened to outflank Caesar.
When the two lines engaged, the cavalry in the centre of line fled but the light infantry remained until the cavalry should charge again.
Caesar's infantry broke ranks to engage the cavalry, only to be surrounded by the light infantry. C. therefore ordered his men not to advance more than four feet ahead of the standards.
C.'s troops were driven into a circle and forced to fight in a confined space.
C. ordered the line to be extended as far as possible, and alternate cohorts to turn about to face the enemy.
C. split the enemy's cordon and his infantry renewed the fight, falling back on his defences and causing heavy casualties to Labienus' troops.
The arrival of Labienus' cavalry reinforcements forced Caesar back onto the plain. Eventually, Caesar urged his men to drive back the enemy and seize the high ground. Once this objective had been achieved, the Caesarian troops retired to their own defences.

Uzitta 46 BC B.Afr.59-61
Scipio: Centre held by his own & Juba's legions with a reserve of Numidians behind. On the wings were elephants with light infantry and Numidian auxiliaries behind them. The cavalry was stationed on the right wing as the

left was protected by the town of Uzitta and there was no room to deploy cavalry there. Large force of Numidians and light infantry on his extreme right. His intention was to outflank Caesar's smaller force and surround it.
Caesar: His right wing was protected by fortifications so his battle line here was a duplex acies. He concentrated his reserves on his left with a duplex acies here, stretching as far as his centre, to counter the large cavalry force on Scipio's right. He stationed his cavalry on his left wing and, as he lacked confidence in them, he interspersed them with light infantry and sent up the Vth legion in support. Detachments of archers were stationed at various parts of the line, and especially on the wings.
There was no battle.

Thapsus 46 BC B.Afr.80-6

Scipio: legions were drawn up in front of his rampart with elephants on both wings.
Caesar: drew up a triplex acies with five cohorts from the Vth legion on each wing to form a quadruplex acies facing the elephants. Archers, slingers and cavalry interspersed with light infantry were posted on the wings.
The elephants on the right wing were forced back by volleys of missiles and Scipio's cavalry fled with them.
With the right wing gone, C.'s infantry easily captured the enemy's rampart.
Scipio's forces were routed.

Munda 45 BC B.Hisp.29-31

The plain between the two camps of Pompeians and Caesarians was very suitable for cavalry operations.
Pompeians: 13 legions; cavalry with light infantry and further auxiliaries on the wings.
Caesar: Legions in the centre (Xth held the right wing as usual), auxiliaries and cavalry on the wings.
C. began to restrict the operational area but his men argued against this.
C.'s troops charged uphill. The Xth was initially so successful on the right that, to prevent the Pompeian left being surrounded, a legion was despatched from the Pompeian right.
Immediately Caesar's cavalry pushed hard against the left wing.
The Pompeians were driven back and escaped into the town of Munda.

Idistaviso AD 16 Annals II 16

Germans and Cherusci: no details

Germanicus: Few details of battle line, but the Roman troops were alert and ready to deploy from line of march to battle line.

The Germans were massed in front of a forest whilst the Cherusci on top of a ridge.

The Cherusci charged; Germanicus sent part of his cavalry to attack their flank and the remainder to take them in the rear.

The Roman infantry attacked and put to flight both Germans and Cherusci.

The Cherusci attacked Germanicus' archers but were held off by auxiliary infantry.

The Germans fled and were massacred.

M.Furius Camillus vs Tacfarinas AD 17 Annals II 52

Romans: Camillus' one legion held the centre of the line, with auxiliaries and an ala on each wing.

No details of Tacfarinas' dispositions.

There was no battle.

L.Apronius vs Frisii AD 29 Annals IV 73

The Romans were crossing a ford into territory defended by the Frisii in line of battle.

Apronius sent in the Ala Canninefatum and auxiliary infantry to attack the enemy's rear but these were repulsed, as were the legioniary cavalry he sent in next.

3 light armed cohorts, then two more, then all the auxiliary cavalry were thrown in. These troops were sent in at intervals and were caught up in the panic of troops sent in earlier.

The remainder of the auxiliary infantry, under the command of a legionary legate, was sent in and drove back the enemy in a sharp engagement. The defeated auxiliaries and cavalry were brought off in a state of exhaustion.

1st revolt of Iceni AD 47 Annals XII 31

The only troops Ostorius Scapula had with him were auxiliary cavalry and the Iceni defended an earthwork with an approach too narrow for cavalry. Ostorius therefore ordered his cavalry to dismount and fight on foot. They defeated the Iceni.

Corbulo vs Tiridates AD 58 Annals XIII 38

Corbulo drew up his legionaries in the centre and auxiliaries outside them, presumably with his cavalry on the wings, though Tacitus does not mention this.

There was no battle.

Suetonius Paulinus vs Boudicca AD 60/1 Annals XIV 34

Suetonius drew up his line in a valley with a wood behind him to prevent ambushes or outflanking manoeuvres. His legionaries held the centre of the line with auxiliary infantry outside them and cavalry on the wings.

The horde of Britons fled and was massacred.

2nd Battle of Cremona AD 69 Histories III 21-5

Antonius Primus agreed to battle despite the absence of the main force under Mucianus because the morale of his troops was so high. The legions of both sides held the centres with auxiliaries and cavalry on the wings, but Tacitus' account lacks detail here.

The battle, a rare night action, was confused and indecisive until the moon rose and shone in the faces of the Vitellian troops, making them excellent targets for the Flavians. The Vitellian troops fled when it was rumoured the main Flavian force under Mucianus had arrived.

Cerialis vs Batavians AD 71 Histories V 16

The front Roman line consisted of cavalry and auxiliary infantry, with the legions drawn up behind. Cerialis remained at the rear with a picked force for use in emergencies.

Mons Graupius AD 73/4 Agric.35-7

The Britons were drawn up in ranks on a hillside; the charioteers filled the ground between the hill and the Romans.

Agricola drew up his auxiliaries in the front line, with the cavalry on the wings. 2 alae were held in reserve on each wing and the legions were held in reserve in front of the camp.

The main force of cavalry drove off the charioteers and Agricola sent in 6 cohorts of auxiliaries.

The reserve cavalry alae drove off an attempted flank attack by the Britons.

The Britons fled, pursued by the cavalry.

The battle was fought on a plain with mountains on one side and cliffs descending to the sea on the other.

Both generals drew up their heavy infantry in the centre with artillery, archers, etc. in the rear to fire over the front rankers. Since the flanks of both sides were protected, no cavalry were stationed on the wings. Instead, An ullinus sent his cavalry over the hills to attack Niger's rear.

When the battle came to close quarters, the Severans formed a testudo to approach the enemy under fire.

The battle was indecisive for a long time but finally Niger's troops proved numerically superior.

A storm blew up in the faces of Niger's troops and they were forced back. At this point the Severan cavalry attacked and Niger's troops fled with heavy casualties.

Appendix 3: Catalogue of Sieges discussed in Chapters 6 and 7

This catalogue is highly selective and is not intended to be an exhaustive catalogue of all Roman sieges. The various literary and archaeological sources have only been included when they add to the understanding of the account; thus the references themselves are also selective.

Date: 406-396 BC
Place: Veii
Refs: Livy IV 40 - v 21
Dionysius of Halicarnassus XII 10
Plutarch Camillus v
Ward Perkins "Excavations beside the N.W gate at Veii 1957-58"
PBSR 1959
Ward Perkins "Veii, the historical topography of the ancient city"
PBSR 1961

A: Veii lies on a large plateau virtually surrounded by steep sided valleys and the Veientes had strengthened the city's fortifications. As a result, it could not easily be taken by direct assault. The siege was traditionally supposed to have lasted ten years and was compared with that at Troy, but siege operations may not have been particularly strenuous for the whole time. The first recorded action after the start of the siege was in 403 BC when the Romans constructed a line of circumvallation round Veii, a contravallation against threats of a relieving army from Etruria, and kept troops there throughout the winter. The following year the Roman force suffered a severe setback when one of the camps was attacked simultaneously by a relieving force of Capenates and Faliscans, and the besieged Veientes. The Romans, however, soon recovered their losses and were able to hold off the Veientes and their allies when they made a second attempt to raise the siege in 399 BC. This time they were attacked in the rear by Roman forces from another of the siege camps. The relieving force was routed and the besieged driven back into Veii. Finally in 396 BC Camillus was appointed dictator and given command of the siege. He strengthened the Roman siege works and had a mine dug up to the citadel. While Camillus made diversionary attacks on the walls of Veii, Roman forces entered the citadel through this mine. The town was sacked and the populations slaughtered or sold into slavery.

B: Despite extensive fieldwork in the area around Veii, no traces of any siegeworks have been found, and no traces are visible from aerial photography. However, most of the fortifications of Veii appear to date to the period

immediately preceding the destruction of the city which corresponds with Livy's statement that the Veientines had strengthened their defences before the siege.

Date: 214-212 BC
Place: Syracuse
Refs: Livy XXIV 34; XXV 23-31
Polybius VIII 3-7
Plutarch Marcellus
Lawrence 1979

A: Syracuse was very strongly defended by a wall extending for the most part along high ground, and by the artillery and other engines prepared by Archimedes. The Romans initially attempted a direct assault from land and sea simultaneously. The land forces were equipped with wicker screens and scaling ladders to attack part of the wall by the Hexapyla gate on the eastern side of the walls. However, whilst the troops were still at a distance, they came under the fire of Archimedes' artillery and suffered heavy casualties. When the Romans did get close to the wall, they came under heavy fire from arrows and artillery fired through narrow loop-holes in the walls, were attacked by grappling hooks which could lift men up and then drop them, and their shelters were crushed by stones and wooden beams.

The sea-borne assault fared no better; it consisted of 60 quinquiremes filled with archers, slingers and javelin men to drive the defenders off the battlements, and 8 more quinquiremes grouped in pairs to support sambucae (scaling engines). The galleys came under the fire of long and short range artillery, while the men were fired on by artillery shooting through the loop-holes. In addition the ships were destroyed by machines firing heavy stones or lead shot and by machines grappling the bows and sinking them. The Romans realized they could not take Syracuse by assault because of Archimedes' engines and resorted to blockade, which was rather ineffective.

Despite the presence of Carthaginian reinforcements in Sicily, Marcellus continued the Roman blockade and in 212 BC he made a surprise night attack with scaling ladders and captured the outer defences of the city. The remaining areas of Syracuse were finally taken when the Romans captured one by storm following a diversionary attack and the other surrendered. The city was given over to the soldiers to plunder and although there was no massacre, Archimedes was killed by a Roman soldier.

B: No archaeological evidence for the siege has been discovered, but the defences were strengthened and redesigned particularly for the use of artillery in the period preceding the siege.

Date: 210 BC
Place: New Carthage (Cartagena)
Refs: Livy XXVI 42-47
Polybius X 8-16
Appian Spanish Wars vi 20

A: New Carthage was situated on a spur of land in a lagoon, connected to the mainland by a ridge only 250 yards wide. The city was particularly important as it was the main base for supplies coming in to Spain by sea from Carthage, so Scipio was eager to take it as quickly as possible. Appian states that Scipio enclosed the town with trenches, but Polybius and Livy, whose accounts correspond very well, state that Scipio deliberately left the causeway unfortified. The Roman fleet occupied the harbour.

The besieged, led by the Carthaginian general Mago, drew up on the causeway, but were forced to retreat into the city by the Romans who then brought up scaling ladders and attempted to take the city by storm. The fleet made a simultaneous attack. However, the Romans were forced to retreat as the walls were defended and many of their ladders were too short. But Scipio immediately made a second assault from both the land side and from the lagoon at low tide. The defenders were caught between the two forces and the city captured. Mago attempted to defend the citadel but surrendered when he realized that the city was completely overrun. Until this point, the Romans had been engaged in indiscriminate slaughter, (according to Polybius on Scipio's orders), but then stopped and turned to plunder.

Citizens of New Carthage were released whilst non-citizens and slaves were sent to the fleet. Amongst the Roman plunder were several hundred pieces of artillery and a great quantity of equipment and missiles.

Date: 203 BC
Place: Locha, Spain
Refs: Appian Punica 15

Locha was a large town which was besieged by Scipio and Masinissa with great difficulties. As the Romans were about to attack with scaling ladders the Lochaeans offered to leave the city under a truce. Scipio sounded the recall

but the soldiers were angry because of their sufferings during the siege and refused to obey. They scaled the walls and began an indiscriminate slaughter. Scipio dismissed the survivors to safety, deprived the army of its loot and executed three of the officers, chosen by lot, who had disobeyed orders.

Date: 189 BC
Place: Ambracia, Epirus
Refs: Polybius XXI 27-29
Livy XXXVIII 4-9

Ambracia had strong natural defences and a strong wall, and was besieged by the consul Marcus Fulvius. His first action was to build two camps and a castellum opposite the citadel, all connected by a rampart and ditch. The circumvallation was intended to prevent the besieged breaking out and reinforcements breaking in, but two groups of reinforcements did achieve this during the siege. Having constructed these works, Fulvius began a large-scale assault. Five siege engines attacked the wall simultaneously, and the Romans also used rams and sickle-shaped wall-hooks to bring down the battlements. Against these the defenders used cranes to drop weights on the rams, caught the wall-hooks with grapples and made frequent sorties. The Romans kept breaking down sections of the wall but could not profit from this as the besieged defended the gaps and quickly built up replacement walls.

As a last resort, Fulvius had a mine dug towards the city. Although the Romans took care to hide their actions, the besieged realized what was happening when the saw the spoil heap. They dug a trench inside the wall and hung up brass plates to discover the position of the tunnel by the vibrations, then dug a countermine to intercept the Roman mine. By this time the Romans had reached the wall and underpinned a large part of it. When the two tunnels met an underground fight broke out, first between the sappers, then armed men. The situation was a stalemate until the besieged used a device to blow noxious fumes through the mine forcing the Romans to retreat. The town later surrendered on condition that the garrison be allowed free, and there appears to have been very little plunder.

Date: 171 BC
Place: Haliartus, Boeotia
Refs: Livy XLII 63

Lucretius, who was commanding the operation, brought up a number of siege engines and rams but the besieged made frequent sorties, destroying the rams with stones and lead weights and when stretches of the wall were destroyed the besieged hastily built up a rubble replacement. Because the assault was taking too long, Lucretius ordered scaling ladders to be brought up on all sides. He made a diversionary attack against the town at several other points simultaneously. The young and old men were massacred and the armed men fled to the citadel but surrendered the following day. The inhabitants were sold into slavery and the city was looted and razed to the ground.

Date: 147-146 BC
Place: Carthage
Refs: Livy LI (Ep)
Appian Punica 117-133
Plutarch Apophthegemata 200

The only narrative account is that of Appian, which was based on Polybius'. The siege was a complex operation involving the capture of different areas of the city which had independent defences. Scipio's first capture was the suburb of Megara, by storm, and as a result Hasdrubal the Carthaginian general tortured and executed Roman prisoners to make surrender impossible. Scipio then dug a trench across the isthmus and another looking towards the mainland and joined the two lines to form a quadrangle in which he stationed his army. The ditches were filled with sharp stakes and were palisaded. The side looking towards Carthage was fortified by a wall 25 stades (4.5 km) long, 12 ft (3.5 m) high and 6 ft (1.7 m) wide, with parapets and towers, one of which was used for observation.

Supplies to Carthage were cut off by this work but Scipio's ships were rather ineffectual at ensuring the blockade so he blocked the harbour with a massive stone mole. The Carthaginians, however, dug another entrance and an indecisive naval engagement followed. Attempts were then focused on the capture of a quay which the Romans partially demolished with a ram. The Carthaginians then drove off the Romans, burnt their engines and began rebuilding the quay but were forced to retreat again after the Romans constructed engines and mounds to fire incendiary devices. The Romans eventually recaptured the quay and Scipio had it fortified and garrisoned.

During the winter of 147-146 BC Scipio campaigned against Carthage's allies in Africa so Carthage could receive no supplies from Africa or elsewhere. The offensive against Carthage was resumed in early spring of 146 BC with the capture of the inner circular harbour, the neighbouring forum and Temple of Apollo. As the Romans advanced towards the citadel of Byrsa they were fired on from the roof-tops. Two battles developed, in the streets and along the roof-tops, but when the Romans reached Byrsa they fired the houses and the inhabitants were burnt. Byrsa held out for six days, then surrendered and the defenders were spared. However, Hasdrubal and about 900 Roman deserters held out in the Temple of Aesculapius. Shortly afterwards Hasdrubal surrendered to Scipio and the deserters were burnt in the temple.

Carthage itself was totally destroyed, but there seems to have been no massacre of the population despite Hasdrubal's treatment of the Roman prisoners.

Date: 143-133 BC
Place: Numantia (Garray, Soria, Spain)
Refs: Appian Iberica 76 ff
Florus I 33
Orosius V 7
Schulten Numantia
Schulten Historia di Numancia
Cheesman "Numantia" JRS 5 (1915)

A: Numantia was situated on a plateau surrounded by rivers and ravines. After two unsuccessful attempts to take the town, Scipio was elected to take charge of the campaign in 134 BC. He avoided a pitched battle and preferred to reduce Numantia through blockade because of the eagerness of the Spanish rebels. Seven camps were constructed round the town (4 according to Florus), then Scipio ordered the town to be surrounded with a ditch and palisade. Orosius claims that this was 10 ft (3 m) wide and 20 ft (6 m) deep, which seems highly unlikely. The works enclosing Numantia were over 48 stades long and Scipio devised a signalling system in case of trouble.

When this ditch work was completed, Scipio had another built not far behind it and this was also fortified with a palisade. Immediately behind this ditch was a wall 8 ft wide (2.4 m) and 10 ft high (3 m), not including the parapets. Towers built along the whole line of the wall at intervals of 100 ft (30 m) were

used for signalling and artillery. Where the line went through marshland, an embankment of the same dimensions as the wall was constructed.

Communications by the river Duero were blocked by the construction of a tower on either side of the river from which large timbers were moored so that they reached across the river. The timbers were stuck full of knives and spear heads and were kept rotating by the river current. The Romans were able to hold off attacks on the siege works from Numantia and the besieged were eventually compelled to surrender through starvation. The Numantines were sold into slavery and Numantia itself was razed to the ground.

B: The site of Numantia was investigated by Schulten over a number of years from 1905. Schulten believed that as Appian's account was based primarily on that of an eyewitness (Polybius) it was accurate. As a result he seems to have made particular efforts to confirm in the archaeological record many of the details reported in Appian's account. Schulten found more than the seven camps mentioned by Appian, but claimed that there were seven camps and two redoubts by the rivers to prevent supplies being brought into the town. No evidence was found of the first ditch and palisade, though Schulten believed that this would only have been necessary on the eastern side of the town where there was no protection for the besiegers from the rivers.

The circumvallation itself was about 9 km long, which corresponds roughly to Appian's estimate of about 50 stades (9.2 km), and the stone wall was found in five stretches. It has an average width of 4 m, much wider than the 8 ft (2.4 m) given by Appian. Schulten suggested that the difference was because Appian gave the width of the wall at its top. The original height of the wall is not known. No trace of the ditch in front of the wall mentioned in the literary sources was found at any point in the circumvallation. Post holes from the wooden towers were found but the actual distance between towers is not mentioned by the excavators.

Date: c.116 BC
Place: Cirta (Constantine, Algeria)
Refs: Sallust B.Jug.21-23

Jugurtha besieged his enemy Adherbal in the town of Cirta which had very strong natural defences. He encircled the town with his forces and attempted to take it by storm using mantlets (vineae), towers and a variety of machines.

As he was unable to take Cirta in this way, Jugurtha surrounded it with a rampart and ditch, built towers and pressed the attack night and day using force and stratagems, including bribery. However, despite enormous efforts, Jugurtha was unable to take the town and eventually abandoned the siege.

Date: 108 BC
Place: Thala
Refs: Sallust B.Jug.75-76

The town was very strongly protected by its position on a steep hill and its fortifications. Metellus encircled the town with a rampart and ditch, then in the two most suitable places he moved forward mantlets and threw up a mound on which towers were erected to provide covering fire. The besieged were equally prompt with their (unspecified) counter measures. However, after six weeks the Romans breached the walls with rams and captured the town. There does not seem to have been a massacre, though Roman deserters in the town committed suicide.

Date: 87 BC
Place: Athens & the Piraeus
Refs: Appian Mithridatic Wars 30-40

Athens and the Piraeus were held by Archelaus and a force of Cappadocians who used the Periclean walls for defence. Sulla arrived with five legions and auxiliaries and tried to take the Piraeus by storm. When he was forced to retire he demolished part of the Long Walls to build a siege ramp, and also had engines and artillery constructed. Both sides built towers to fire at the other. During the siege the defenders made a number of sorties against the Romans and succeeded in burning some of the Roman siege equipment. Sulla was kept informed of events in the town by traitors firing inscribed lead sling shots to the Romans. As a result of this information, Sulla was able to ambush the supplies sent to Athens.

As winter came on Sulla established a camp at Eleusis and protected it by a deep ditch. At the same time he made frequent assaults on the walls but without success. During one particularly violent skirmish, Sulla used a type of catapult which supposedly fired up to 20 heavy lead shots at one volley, forcing Archelaus to withdraw his wooden tower.

When the Roman ramp was completed, Sulla brought up engines but the besieged had secretly undermined the mound and carried away the earth. When the mound subsided the Romans were forced to withdraw their engines. Sulla then had a tunnel dug to intercept the defenders' mine. When the tunnels met the diggers fought an underground battle. Meanwhile Sulla repaired the ramps and demolished part of the walls with rams. The Romans also mined under part of the wall, underpinned it with wooden beams and then fired it with sulphur, hemp and pitch, causing the walls to collapse. The besieged built a semicircular wall inside which Sulla attacked while the mortar was still damp, but his men were fired on from all sides and were forced to retreat. Sulla then abandoned the assault, began a blockade and turned his attention to Athens itself.

After hearing reports from Athens that the defenders were starving and resorting to cannibalism, Sulla had the city encircled with a ditch to prevent the defenders escaping, then brought up scaling ladders and rams. The defenders fled and Sulla ordered an indiscriminate massacre of the inhabitants. A few occupied the acropolis after burning the Odeum so there would be no timber readily available for an assault, but it was soon captured. Sulla forbade the burning of the city but allowed his soldiers to plunder it, then pardoned the Athenians who had survived the slaughter.

The Romans then renewed the assault on the Piraeus with rams and artillery and undermined the walls. They succeeded in demolishing part of the newly built semicircular wall, but Archelaus had anticipated this and had built several others like it inside so that the Romans came upon one after the other. Despite this the Romans pushed on the assault and Archelaus fled to part of the Piraeus which was strongly fortified and surrounded by the sea. As Sulla had no ships he was unable to attack it but Archelaus shortly withdrew to Thessaly.

Date: 57 BC
Place: Noviodunum (?Pommiers, France)
Refs: Caesar BG II 12

When Caesar was informed that the oppidum did not have a proper garrison he immediately tried to storm it but was defeated by the width of the ditch and height of the walls. He therefore built a camp, brought up mantlets (vineae) and made preparations for a siege. Before he had finished the defeated army

of the Suessones fled into the oppidum. When they saw the mantlets rushed up to the wall, the earth being piled up (either filling the ditch or building a siege ramp), and siege towers, the Gauls were alarmed and requested surrender which Caesar granted.

Date: 57 BC
Place: Oppidum of the Atuatuci (?Namur, Belgium)
Refs: Caesar BG II 29-33

The oppidum had great natural strength surrounded by steep slopes except at one point where there was a gently sloping approach approximately 200 ft (60 m) wide. On the arrival of the Romans the Gauls sortied and a number of skirmishes followed. Caesar then had an earth rampart 12 ft wide (3.5 m) built with a circuit of (?) 5 miles and redoubts at frequent intervals. Then the Romans built mantlets (vineae), a siege ramp and a tower some way off. The Gauls at first ridiculed the tower but when they saw it moving towards them they were alarmed and surrendered. Caesar shut them up in their oppidum to prevent his men from harming them but they made a night sortie and were driven back with heavy losses. The following day the Romans stormed the oppidum and Caesar sold the entire population into slavery.

Date: 56 BC
Place: Oppidum of the Sotiates (?Sos, France)
Refs: Caesar BG III 21

P. Crassus was besieging the defeated army of the Sotiates in an oppidum and immediately prepared for an assault. Because the garrison resisted he moved up mantlets (vineae) and towers. The besieged first attempted a sortie and then tunnelled in the direction of the siege ramp and mantlets using their skills gained in copper mining and quarrying. The Romans' vigilance meant that they could not achieve anything through these mines so they surrendered.

Date: 54 BC
Place: British oppidum
Refs: Caesar BG V 9

The Britons were holding a position with very good natural and artificial defences using felled trees to block all the entrances to it. The Britons tried in small groups to stop the Romans penetrating the defences but they piled up

earth against the fortifications under the protection of a testudo and captured the oppidum, driving the Britons out.

Date: 54 BC
Place: Cassivellaunus' oppidum
Refs: Caesar BI V 21

The oppidum was fortified by a rampart and trench and was well protected by forests and marshes. Caesar attacked on two sides and the Britons, after putting up a brief resistance, fled. Many were captured and killed.

Date: 54 BC
Place: Q.Cicero's winter camp
Refs: Caesar BG V 38-49

Q.Cicero was besieged in his winter quarters unable to get a message through to Caesar. He strengthened the defences of the camp using timer to build up to 120 towers overnight. The next day the Nervii assaulted the camp filling in the ditches but for days the Romans were able to hold out. They prepared fire hardened stakes and siege spears (pila muralia) and built extra storeys on the towers with wicker breastworks topped by battlements.

The Romans refused to surrender and the Nervii surrounded the camp with a 10 ft high (3 m) rampart and a 15 ft wide ditch (4.5 m), a technique they had learnt from watching the Romans. Despite not having the proper tools they built a 3 mile circumvallation in just three hours, then worked on towers to overtop the Roman rampart and made assaults using grappling hooks and testudines under the instruction of Roman prisoners. After several days the Nervii fired moulded bullets of red hot clay and incendiary darts (fusili argilla glandis fundis et iacula ferrefacta) at the camp buildings, aided by a strong wind. When these caught fire the Nervii assaulted the camp with towers, testudines and scaling ladders. The Romans held on despite overwhelming odds and Cicero finally got a message through to Caesar who came to relieve the siege.

Date: 52 BC
Place: Vellaunodunum
Refs: Caesar BG VII 11

When advancing to deal with the revolt of Vercingetorix Caesar wished to take the oppidum at Vellaunodunum so that no enemy in his rear could interrupt his

supply lines. In two days he built a circumvallation and on the third day the garrison surrendered.

Date: 52 BC
Place: Avaricum (Bourges)
Refs: Caesar BG VII 14-28
Dio XL 34

Avaricum was a hillfort in a very strong position, almost completely surrounded by a river and marsh and with a strong murus gallicus wall. The nature of the terrain made a circumvallation impossible to Caesar pitched his camp by the narrow causeway which linked the hillfort with the surrounding land and under the protection of mantlets (vineae) the Romans began constructing a siege ramp with two towers. The siege operations were hindered by the strong defences, attacks by Vercingetorix and bad weather but despite this the Romans built a ramp 330 ft wide (97 m) and 80 ft high (23 m) which almost reached the wall. This took 25 days.

The besieged in turn used a variety of defensive techniques, including pulling away siege hooks with nooses and pulling them up with windlasses, building towers covered with hides along the length of the wall which they also increased in height, undermining the siege ramp, using their skill acquired as iron miners, and countermining the Roman tunnels to block them with hardened stakes, pitch and boulders. As the Roman siege works approached the walls, the Gauls fired it from their tunnels and at the same time made a sortie, piling pith and all kinds of inflammable material on it. The Romans were able to respond quickly and after a hard fought action the fires were extinguished, the siege towers withdrawn and the Gauls forced back into Avaricum.

The following day the Roman towers were moved forwards and their other siege works were positioned. During a heavy rainstorm when the Gallic defences were not heavily manned, Caesar launched his attack, causing panic among the Gauls. They abandoned the walls and reformed in the town centre but scattered when they saw that the Romans had occupied the whole circuit of the wall. The population and defenders of Avaricum were massacred in revenge for the slaughter of Romans at Cenabum and because of the efforts the Romans had taken over the siege. Caesar states that from the population of c.40,000 barely 800 escaped to Vercingetorix.

Date: 52 BC
Place: Alesia, (Alise-Ste-Reine, France)
Refs: Caesar BG VII 63-90
Dio XL 39-41
Napoleon III Histoire de Jules César
Rice-Holmes Caesar's conquest of Gaul

A: Alesia's situation on a steep sided plateau meant that it was impregnable except by blockade. There were rivers on two sides and in front of the town was a plain about three miles long. Gallic troops occupied the whole of the eastern slope of the hill below the town's walls and fortified their position with a ditch and wall 6 ft high (2 m).

Caesar's siege works were very elaborate: camps were constructed at strategic points and 23 redoubts. Then a trench 20 ft wide (6 m) with vertical sides was dug to protect the Romans while they worked on the circumvallation. About 400 paces behind this trench were 2 trenches, each 15 ft wide (4.5 m). The inner one was filled with water diverted from the river. Behind the trenches was a rampart and palisade 12 ft high (3.5 m), a breastwork with battlements and large forked branches projecting at the point where the breastwork joined the rampart. Towers were erected at intervals of c.80 ft (23.5 m) and extra defences (cippi, lilia and stimuli) were added because of the small size of the Roman force. This line was 11 miles long (16.2 km) and the Romans constructed another identical line of fortifications facing outwards, this one 14 miles long (20.7 km) to protect themselves from the Gallic relieving army which had been sent to Alesia.

The Gauls then forced the Mandubii, the inhabitants of Alesia, to leave with their wives and children because of lack of supplies but Caesar refused to allow them through the Roman lines, so they remained between Alesia and the Roman lines and starved. The besieged then drew up their forces in front of the town, filled the first ditch with wattles and earth but a simultaneous attack by the besieged and relieving army was made, but they could not break the Roman defences. The next few days were occupied with preparations and attacks by the Gauls on both sides of the Roman defences, but these defences held.

The relieving army then attacked a badly sited Roman camp to the north of Alesia and Roman reinforcements had to be sent, leaving the defences undermanned. The besieged then turned their attention to the Roman wattles

and tearing down the rampart and breastworks with hooks. Again reinforcements were sent but it was not until Caesar was recognized by the colour of his cloak that the Romans rallied and repulsed the attack. The Gallic relieving army was also repulsed and when the Gauls saw cavalry to the rear and fresh cohorts coming up they broke and fled, suffering serious casualties whilst pursued by the cavalry. The next day Vercingetorix was handed over to Caesar and Alesia surrendered.

B: Napoleon III carried out extensive excavations in 1862-65 at Alesia with the intention of tracing Caesar's siege works. He appears to have been fairly successful and traced the positions of Caesar's eight camps and five of the redoubts around the circumvallation. Large sections of the investing works and their defences were traced and sectioned and some of the extra defences mentioned by Caesar such as stimuli were found.

Like the other siege works, the camps were positioned to make maximum use of the terrain. Napoleon probably had this in mind when he plotted the conjectural positions of the 18 redoubts not found in the excavations.

The Roman ditch between the investing works and Alesia was traced along most of its length and was found to be slightly less than 6 m wide. The inner line of investing works has the flat-bottomed ditch and V shaped ditch one is usually a little less. Both ditches are about 4.5 m wide, though the V shaped one is usually a little less. Neither is 4.5 m deep as Caesar says, but only 2.4 - 2.7 m deep. Silt deposits in the flat-bottomed ditch show that it held water diverted from the river. The outer line of works was only protected by a flat-bottomed ditch on the plain, and a V-shaped ditch at other points; no traces of the wooden towers mentioned by Caesar survive.

Date: 51 BC
Place: Uxellodunum (Puy d'Issolu, France)
Refs: Caesar BG VIII 32-44
Napoleon III Histoire de Jules César
Rice-Holmes Caesar's conquest of Gaul

A: Uxellodunum was situated on a plateau protected on all sides by steep rock and impossible to take by storm despite the fact that it was held by about 200? Gauls. The legate Caninius arrived with two legions, divided them into three detachments and built three camps on very high ground. From these he

gradually constructed a rampart round the town as far as his limited manpower allowed him.

Hoping to avoid the starvation which the besieged had faced at Alesia, the Gallic leaders went foraging leaving a garrison. The Romans surprised the foragers and cut them to pieces. The siege was continued and as there was no danger of Gallic forces outside Uxellodunum, Caninius divided his troops between a number of guardposts and completed his ring of fortifications, building siege works everywhere. Gaius Fabius arrived soon after with 25 cohorts and took over part of the siege works. But the besieged still held out and although Caesar regarded the numbers as insignificant he thought that their obstinacy called for severe punishment to discourage the Gauls from revolt.

By the time Caesar arrived at Uxellodunum the town was completely enclosed by siege works making escape from the blockade impossible. As the besieged had a very large grain supply Caesar set about cutting off the water supply. The rivers could not be diverted so Caesar cut off access to them by posting archers, slingers and artillery. This left one spring from which water could be obtained.

The Romans built a ramp despite the difficulty of the terrain and continual skirmishes between the two sides. At the same time the Romans secretly dug a tunnel towards the source of the spring. The ramp was 60 ft high (17 m) with a ten storey tower containing artillery to dominate the spring. The Gauls responded by filling barrels with incendiary materials, firing them and rolling them down on the Roman siege works, and at the same time launching an attack. The Roman siege works were burnt but Caesar ordered troops to climb up to the walls of Uxellodunum; the Gauls were recalled as it looked as if the Romans were getting control of the fort. The besieged still refused to surrender even though some had died of thirst. Finally the Roman tunnels reached the spring and diverted it. When the Gauls saw the spring suddenly fail they took it as an omen and surrendered. There was no massacre, but to deter further outbreaks of revolt Caesar ordered that the hands of all those who had carried weapons should be cut off.

B: The site of Uxellodunum, Puy d'Issolu in the French Department of Lot, was investigated by Napoleon III in 1865. Traces of three camps were found, two of which were not properly fortified, possibly because they were in very strong positions. The third was strongly fortified by a double line of parallel ditches which appears to have continued to form part of the circumvallation, the only point at which is had been found.

One particularly interesting discovery was a tunnel on the west side of Uxellodunum which has been identified as the tunnel dug by the Romans to divert the spring. The tunnel was about 1.5 m wide and 1.8 m high with an arched roof. At certain points along its length the Romans supported the roof and walls with wooden props, some of which survived.

Date: 51-50 BC
Place: Pindenissum, Cilicia
Refs: Cicero Ad Fam.II 10; XV 4; Ad Att.V 20

Pindenissum was a strongly fortified hillfort in S.E.Cilicia held by well armed Cilicians who were believed to be pro-Parthian. Cicero drew a rampart and ditch round the town with one very large camp and six smaller ones. Then he pressed the assault with a large siege ramp, penthouses (vineae), a siege tower and plenty of artillery. After a 57 day operation the hillfort was taken with many Roman casualties but no fatalities. The town was completely destroyed and the population forced to surrender.

Date: 49 BC
Place: Massalia (Marseilles)
Refs: Caesar BC I 34-36; 56-58; II 1-22
Lucan Pharsalia III 308-762
Vitruvius de Architectura X xvi 11-12

The siege of Marseilles was one of the first major actions in the civil war between Caesar and Pompey. The town was situated on a rocky promontory, surrounded on three sides by the sea. The inhabitants had stocked up the city with stores, set up arms factories and repaired the town's fortifications and fleet. Marseilles had sided with Pompey and could not be persuaded by Caesar to surrender. The defence of the town was led by Domitius Ahenobarbus who had been sent there by Pompey. Caesar brought up three legions and began the siege.

Caesar himself does not mention a line of circumvallation but Lucan reports that he pitched camp on a hill facing the citadel and drew a large rampart with battlements from this camp to the sea on both sides, cutting off water supplies. Towers and mantlets (vineae) were prepared and warships were built at Arles to engage the fleet at Marseilles. At this point Caesar went off to Spain leaving his legate Trebonius to conduct the siege. The siege was carried on by land and sea with Caesar's fleet getting the better of Domitius'.

On the land two timber siege ramps and towers were built under the protection of mantlets, the ramps reaching 80 ft high (23 m). However the defenders had a huge arsenal with extremely powerful artillery including machines that fired 12 ft (3.5 m) spiked beams. As a result the Caesarian forces had to built very strong mantlets and a testudo which Caesar describes in detail. But the Caesarians were hindered by the strength of Marseilles' defences and in particular the artillery, though they easily repulsed sorties aimed at burning the siege works.

The Caesarians then built a brick tower on the west side of the operations to retire to during sorties and to fight from. It was built very strongly with walls 5 ft (1.5 m) thick. When finished it was a 30 ft (9 m) square tower six storeys high with loop-holes for artillery. Under covering fire from this tower the besiegers built a very strong covered gallery (musculus) 60 ft long (17.7 m) and rolled into place to link the brick artillery tower with a tower on the town wall. The gallery withstood boulders and incendiary devices while the besiegers began undermining the tower, causing part of the wall to collapse. Vitruvius, who was probably one of the Caesarian engineers at Marseilles, states that more than 30 mines were being dug towards the city so the besieged dug their moat deeper and created a water filled basin inside the walls to flood and destroy the mines.

After the collapse of the tower a truce was arranged because Caesar was particularly keen for the city to surrender. But the besieged broke the truce and fired all the Roman siege engines including the brick tower. According to Vitruvius the siege ramp was set on fire by ballistae shooting red hot iron bolts.

Trebonius resumed the seige and because of a shortage of wood improvised by building a very strong new ramp with brick sides. Gates were left in the walls to allow troops to advance under cover and the besiegers brought up all their equipment under its cover. Since a great part of the city wall was in ruins, the besieged were short of supplies and the range was now too short for their catapults, they surrendered. Caesar spared the city and its inhabitants because of its antiquity and fame, but left a garrison of two legions.

Date: 41 BC
Place: Perugia
Refs: Appian BC V 32ff
Velleius Paterculus 74 3

Perugia was held by Antony's brother Lucius with a newly raised army of 6 legions and he was awaiting reinforcements. When Octavian arrived with his entire army he immediately drew a palisade and ditch round the town 56 stades long (10.7 km) and extended these works to the Tiber to cut off supplies coming by river. Lucius then built a similar line of countervallation at the foot of the hill of Perugia to strengthen the defences.

Octavian quickly strengthened his investment, doubling the depth and width of the ditches to 30 ft (8.8 m) deep and wide. He increased the height of the rampart and built 1500 wooden towers along it at 60 ft intervals (17.7 m). There were also strongly fortified camps and various other entrenchments with the lines facing both inwards and outwards to besiege those within and for protection against the expected relieving army. There were frequent skirmishes during the construction of the siege works but when they were completed Perugia began to starve. As there was no sign of the relieving army Lucius attempted to break out with his forces using gear for filling ditches and folding ladders under covering fire.

The besieged made a violent assault, filled up the ditch and scaled the palisades. Some began undermining the circumvallation walls whilst others fired arrows and lead shot. The mass attack meant that at first Octavian's resistance was fairly limited but then his army rallied and threw down the ladders and engines. Lucius' army was forced back into the town and then surrendered; Velleius suggests that Octavian succeeded in taking it by storm. Octavian punished the city officials rather than Lucius and intended to turn

the city over to his soldiers to plunder but it caught fire, according to Appian, when one citizen fired his own house.

Date: AD 26
Place: Hillfort in Thrace
Refs: Tacitus Annals IV 46-51

The Thracian mountain tribesmen had revolted and were occupying strongly defended hilltop fortresses. Sabinus built a camp and then seized a narrow ridge which led to the nearest Thracian hillfort. The Thracians sortied but were repulsed; Sabinus moved his camp nearer the hillfort and began constructing redoubts round the fortress which he linked with a ditch and breastwork 4 miles in circumference (5.9 km). He gradually tightened the blockade to cut off the defenders from water and fodder, and built a mound from which to throw rocks, spears and firebrands at the Thracians.

The Thracians suffered a serious water shortage and disagreement arose over tactics; one party surrendered to Sabinus and of the men who remained, some committed suicide whilst others attempted to break out with hurdles and scaling ladders. The Romans forced them back with siege spears (muralia pila) and missiles and although a few Thracians broke through the Roman lines the rest were forced back into the hillfort and surrendered.

Date: AD 43
Place: Southern Britain
Refs: Suetonius Vesp.4
Richmond Hod Hill vol II

A: Vespasian's achievements during the conquest of Britain were the defeat of two powerful tribes, the capture of more than 20 oppida and the capture of the Isle of Wight.

B: Hod Hill may have been one of the oppida taken by Vespasian. The hillfort defences were undergoing alterations at the time of the Roman invasions but these were left unfinished. Richmond has attempted to reconstruct events from the evidence inside the hillfort. Here, one hut came under heavy catapult fire, shown by the distribution of catapult bolts on the ground. The distribution suggests a catapult was situated at the east corner, possibly on a tower at least 50 ft high. The concentration of fire was probably on a chieftain's hut and was presumably intended to induce surrender. This

appears to have been successful as there is no evidence of an assault on the hillfort or destruction inside, although the defences were slighted.

Date: AD 51
Place: Hill in N.Wales
Refs: Tacitus Annals XII 33-35

When he was about to fight the Romans Caratacus selected a site which would be favourable to him and impede the Romans; on one side were steep hills and wherever the slope was gentler the Britons build crude stone ramparts. At the front of the hill facing the Romans was a river with a difficult crossing. On his arrival Ostorius made a reconnaissance of the defences, crossed the river and attacked the rampart. In an exchange of missiles the Romans came off worse but under cover of a testudo formation they tore down the makeshift rampart. In the subsequent fight at close quarters the Britons, unprotected by armour, were driven back and cut to pieces.

Date: AD 58
Place: Volandum, Armenia
Refs: Tacitus Annals XIII 39

In order to avoid a drawn out an unprofitable campaign in Armenia and put the Armenians on the defensive, Corbulo prepared to destroy their forts. Two were attacked and stormed by officers while Corbulo attacked Volandum, the strongest fort in the region. On arrival Corbulo made a reconnaissance and planned an assault. He then divided his force into four detachments; one began to undermine the wall under a testudo formation and another attacked with scaling ladders. The two other detachments provided covering fire of torches and javelins fired by artillery and two types of slingers firing lead shot at long range.

The Armenians were very hard pressed at every point and the attack was so fierce that the defenders were forced from the walls in a few hours, the barricades at the gates were flattened and fortifications taken with no Roman fatalities and only minor casualties. Every adult male was slaughtered, the non-combatants sold into slavery and the town thoroughly plundered.

Date: AD 67
Place: Jotapata
Refs: Josephus BJ III 135-408

Jotapata was the first of the three great sieges which formed the putting down of the Jewish revolt. The siege was described in great detail by Josephus who commanded the Jewish forces in the town. The town itself was situated on a high plateau accessible only from the north and Josephus had incorporated this slope into the defences. Vespasian pitched camp to the north of the town in the best position to carry out the siege and the first Roman actions were failed attempts to take the town by storm.

Vespasian therefore began a ramp to attack the vulnerable section of the wall under the covering fire of artillery. But the Jews increased the height of the walls as the ramp grew and then sortied and burnt the Roman siege works. Vespasian then decided to starve the town into submission and had a close watch kept on the town. The Jews continued to sortie and cause the Romans such problems that Vespasian reverted to his original plan to take the town by storm.

As the ramps neared the walls a ram was brought up protected by artillery fire. Josephus protected the walls for a time by manoeuvring chaff-filled sacks in front of the ram head but the Romans cut down the sacks with reaping hooks attached to long poles. The Jews then sortied and destroyed the siege works but the Romans set up the ram again and soon forced a breach in the wall. The Romans tried to enter using a testudo formation but the Jews poured boiling oil on them and boiled fenugreek on the gangway boards so the Romans could not get any grip.

The Romans raised the height of the platforms and erected three towers 50 ft high encased in iron for protection, and holding artillery. After 47 days the ramps overtopped the walls and on advice from an informer attacked just before dawn. The Romans captured the town without resistance and mass slaughter followed. Josephus surrendered to Vespasian to save his life.

Date: AD 69
Place: Placentia (Piacenza)
Refs: Tacitus Histories II 19-22

The town of Placentia was held by supporters of Otho who had reinforced the walls, added parapets, heightened the towers and gathered supplies. The besiegers were Vitellians under the command of Caecina and for the first days the action was a violent assault. The besiegers did not have the proper protective equipment and were forced to retire with serious casualties. One side succeeded in burning the amphitheatre outside the walls, but it is not known which, as both were hurling torches and incendiary missiles.

The following day the besiegers attacked with screens and mantlets (pluteii cratesque et vineae) and began to undermine the walls, build an earth siege ramp and attack the gates with crowbars. The defenders armed themselves with stakes, stones, lead and bronze objects and hurled down millstones and missiles at the Vitellians, forcing them to retire. Caecina abandoned the siege.

Date: AD 69
Place: Vetera (Xanten, Germany)
Refs: Tacitus Histories IV 21-24

The legionary fortress at Vetera was designed for two legions but was held by only 5000 soldiers so the ramparts were sparsely manned. The Romans strengthened the defences and demolished the neighbouring civilian settlement but Tacitus points out that the defences were not designed to withstand a siege. Civilis first tried to take the fortress by storm; the Batavians opened fire at some distance but the range was too great although the Romans could return fire with artillery. Some Batavians then used scaling ladders whilst others climbed on a testudo formed by their comrades but they were forced to retreat under a hail of Roman missiles.

Roman deserters and captives then showed the Batavians how to build a timber siege tower to keep the defenders off the rampart whilst others at a lower level could undermine the wall. However the badly built engine was destroyed by stones shot from ballistae. Screens and mantlets (crates et vineae) prepared by the Batavians were burnt by firebolts shot from catapults. Civilis then briefly abandoned the assault, knowing that the Romans were short of supplies.

While the Batavians who had served in the Roman army built siege machinery the Germans made uncoordinated attacks on the rampart. A two storey siege tower was built and pushed towards the Porta Praetoria where the ground was most level. When it was near enough the Romans thrust out poles and used a crane to lift up several of the besiegers at a time and drop them into the fortress. Civilis again gave up the assault and tried to persuade the Romans to surrender.

The Romans held out and when a relieving army arrived made a sortie. In the ensuing battle Civilis was reported dead or injured and the Batavians and Germans fled.

Date: AD 70
Place: Jerusalem
Refs: Josephus BJ V 1-VI 442
Tacitus Histories V 11-13; frags 1-3
Dio LXV 4

Jerusalem was composed of a number of different areas, each with its own fortifications, and held a number of factions who had violent disagreements over how the war should be fought. Titus arrived with four legions and a number of allies and auxiliaries. His first camp was about 3½ miles from Jerusalem, then he moved the legions in closer, three legions on one side of the city and the fourth on the other. The Jews sortied against the single legion but were repulsed and the Romans levelled the ground as far as the city walls. The three legions on the west side of the city then moved in closer to begin the assault and it was only then that the Jewish forces made any attempt to unite.

Titus' first target was to capture the northern suburb of Jerusalem known as the New City and he constructed platforms where the walls were not strongly guarded. An artillery battle broke out, the Jews using captured Roman artillery, but without causing much damage because of their inexperience. The Roman artillery, particularly that of the Xth, was very effective and the Romans brought up a ram. However the Jews were still hindering the assault so Titus had three 75 ft high (20 m) towers set up on platforms to bombard the Jews. Although one tower fell down the Jews were forced to withdraw from the wall, the ram pierced it and after 15 days of the siege Titus captured the New

City. Four days later Titus took the Middle Town after using the ram against a tower in the wall.

A five day lull in hostilities then followed in which Titus tried unsuccessfully to get the Jews to surrender. Titus then divided his legions and built ramps against the fortress of Antonia and the Upper City. The Romans came under heavy fire and Josephus tried to persuade the Jews to surrender, again unsuccessfully. The Jews then undermined the ramps by Antonia and these collapsed. Titus seems to have abandoned the assault for a short time and in three days his legions constructed a 4½ mile long circumvallation (6.6 km) with 13 forts, causing the food shortages in Jerusalem to become severe.

The Romans then concentrated on taking Antonia, built ramps, brought rams to bear on the walls and began undermining them. The wall collapsed because of the assault and Jewish countermines but the defenders had already built another wall behind it which could not be reached by the ram. A short violent struggle for the fortress was ended after two days when a small party of legionaries entered secretly and sounded their trumpets. Titus attacked and the Jews fled. The fortress was destroyed and a wide road built to the Temple, the Romans' next objective. Several ramps were built, rams were brought up and the Romans took the Outer Temple by storm. The Inner Temple was then burnt when a soldier threw in a firebrand.

Again Titus offered the Jews an opportunity to surrender, then took the Lower and Upper Cities, using ramps to reach the latter. The last area of Jerusalem to hold out was Herod's Palace which was also taken using platforms. The final capture was followed by a massacre, although many prisoners were also taken. Many others had committed suicide or died of starvation; Josephus describes with some relish the effects of the famine. Titus razed the entire city apart from three towers and a short section of the wall.

Date: AD 72/73
Place: Machaerus (Mukawar, Jordan)
Refs: Josephus BJ VII 176-
Strobel "Das römische Belagerungswerk um Machärus" ZDPV 90 (1974)

A: The fortress of Machaerus had very strong natural defences, situated on a plateau surrounded by deep ravines. Herod had fortified the place and ensured good supplies of weapons and engines for defence. Bassus, the

governor of Judaea and legate of Legion X, made a reconnaissance and immediately began to built a siege ramp to the east of the fortress. The Jews made frequent sorties and both sides suffered heavy casualties. The Jews eventually surrendered when one of their favourites was captured by the Romans and Bassus made as if to crucify him. Josephus makes no mention of a line of circumvallation but states that the Jews were trapped inside the town.

B: Neither the Roman siegeworks nor the Jewish fortress at Machaerus have been excavated but a certain amount of fieldwork has been carried out, as a result of which the Roman siege ramp, a number of camps and long stretches of a circumvallation have been traces.

Traces of 11 camps of various sizes have been found, and possibly three more. These camps surround the fortress and most would appear to have been connected to the circumvallation, though it is impossible to be certain because of the fragmentary state of the circumvallation.

The circumvallation survives in four long and several short sections. The total surviving lengths are 2.5 km long and the whole circumvallation would have been about 1 km longer. The stone wall varies in width from 1.8 m to 2.3 m along its length and on the S.W sector are the stone foundations of towers, all c. 2 x 4 m, and with an interval of 25-35 m between (80-100 Roman feet).

The earth and stone siege ramp was on the west side, not the eastern as Josephus says, and was c.85 m long and ran along a ridge leading up to the fortress (cf: Masada). Its width varies between 15 m at the base to 30 m at the top. Strobel suggests a siege tower 15-20 m high from the width of the ramp. The ramp appears to be unfinished and its completion may have been rendered unnecessary by the surrender.

Date: AD 72/73
Place: Masada
Refs: Josephus BJ VII 275-406
Hawkes 1929
Schulten 1933
Richmond 1962
Yadin 1966

A: Masada was the last fortress to hold out in Judaea and was held by the Sicarii from AD 66 to its capture in AD 72 or 73. The fortress was situated on

a plateau surrounded by deep ravines and was accessible in only two places, the easier of these, on the western side, guarded by a fort. Masada had a limestone wall 18 ft high (5.5 m) with towers all the way around and the 960 Sicarii were well supplied with food and water.

The Xth legion was very experienced in siege warfare, having been present at both Jotapata and Jerusalem. Silva, the legate of the legion and governor of Judaea, immediately built a circumvallation, forts at strategic points and posted sentries. He then established his HQ at the most convenient site for directing the siege works, on the western side where the rocks on which Masada stood were linked to the higher land around. From here the Romans began work on a siege ramp along a limestone projection which ended 450 ft (135 m) below the level of Masada. A platform of earth 300 ft high (100 m) was heaped up along the projection and as this was not strong enough to take the engines, the Romans built a stone pier 75 ft wide (21 m) wide and the same height on top of it.

A 90 ft high tower (30 m) covered with iron plates and fitted out with artillery and a ram was constructed and when this had been hauled up the ramp, the artillery kept the defenders off the walls while the ram breached the wall. But the Sicarii had already built another wall inside the first and this was of earth and timber and so impervious to the blows of the ram. Silva ordered his soldiers to throw burning torches at it and it caught fire. Josephus states that the Romans kept a close vigil overnight and entered the fortress in the morning to find that all the defenders except 7 had committed suicide.

B: Josephus does not go into great details about much of the Roman siegeworks but it is possible to fill in some of the details from the archaeological evidence. The circumvallation itself, 4.5 km long, was built of the local limestone and is 1.5 - 1.8 m wide. Because of the rough terrain a ditch was not necessary, and not possible because of the hardness of the ground. For the most part the line takes advantage of the steep slopes; on the eastern side where the ground was more open a series of ten stone towers was built along the length of the wall about 80 - 100 m apart. There are eight camps surrounding the fortress, two large and six small, which are situated at strategic points as Josephus stated. Silva's HQ at the most convenient point for directing operations may well be camp F1, very near to the ramp.

The ramp itself, of earth and timber, was essentially an extension of a limestone spur. Nearby was an artificially levelled area, possibly the engineers' yard for the construction of the siege engines. In the fortress itself, where most investigations have been concentrated, little certain evidence has been found of the siege.

Date: AD 135
Place: Beththera (Bettir)
Refs: Dio Ep. LXIX 13
Eusebius Ecclesiastical Hist.iv 6
Carroll "Bettir and its archaeological remains" AASOR 1924
Schulten 1933
Abel Histoire de la Palestine vol II 1952

A: Beththera was a strong citadel near to Jerusalem held by Jewish rebels. The place was besieged by the Romans and the siege lasted a long time before the Jews were destroyed by famine and thirst. Neither Eusebius nor Dio (who makes no specific reference to Beththera) explains whether the place surrendered or was taken by storm. According to the Talmud the siege operations lasted 2½ years though it is not known how intensive the Roman operations were during this period, and when it was taken the inhabitants were massacred.

B: Bettir was recognized as the site of Eusebius' Beththera by the Roman circumvallation which is not mentioned in any of the literary accounts. The circumvallation consisted of two stone walls about 3 m apart, probably filled with earth and small stones. It was 4 km long and at several points along the north and western sections there is a second wall which may form a contravallation, though Schulten suggests a long stretch of this second wall on the vulnerable N.W side may be to provide additional defences. One Roman camp has been identified, on a plateau to the N.E of Bettir, but any others have been destroyed. The archaeological evidence gives no clue as to how the place was taken.

Date: ?
Place: Woden Law
Refs: Richmond & St Joseph "Excavations at Woden Law 1950" PSAS 1982
Frere & St Joseph 1983

B: The Iron-age hillfort at Woden Law is partly enclosed by a series of investing works of Roman design. Three different stages of siege-lines are visible, the innermost being about 21 m from the defences of the hillfort and

all three lines being composed of a number of ditches and ramparts. The ditches vary in depth between 0.9 - 1.2 m and in width between 3 - 3.3 m. The ramparts are 4.2 - 6.3 m wide. In addition there is a mound which may be an artillery platform.

All the lines in the circumvallation are incomplete, there are no signs of any siege camps as at Burnswark, Masada etc. and the hillfort's defences are such that they could have been taken by direct assault. It has therefore been suggested that the works are practice siege works from training exercises. This also explains the successive lines and evidence that the sections of each line were built by different units and not properly linked up. Woden Law was next to a main road and troops undergoing training could have been quartered in the camps at Pennymuir, 1.6 km to the north west of the site. Such practice works are suggested by the literary sources (Appian Iberica 86; Veg.I 25; Seneca Ep.18 6).

Date: ?
Place: Burnswark
Refs: Frere & St Joseph 1983

B: There are two siege camps at Burnswark, one on either side of the hillfort. The larger fort, to the south, has three gateways facing the hillfort, each defended probably by an artillery platform. The northern camp dominated the hillfort's water supply but is incomplete. There is no circumvallation. Lead and clay catapult shots were found on the hillside. The site may have been used as a training area, as at Woden Law. Alternatively, the presence of two camps suggests that an actual siege may have been carried out. This is made more likely by the presence of 2nd century pottery on the site and it may have been held by rebels. It if was, the siege appears to have been resolved before the northern camp was finished.

Date: c.AD 199-200
Place: Hatra
Refs: Dio LXXVI 10-
Herodian III 9 3

Dio describes Hatra as being surrounded mostly by desert with little water or other supplies available locally, thus creating considerable difficulties for besiegers. He blames this partly for the failure of both Trajan and Severus to take the city. Only Dio mentions that Severus made two attempts to capture

Hatra. On the first attempt Severus withdrew after suffering heavy losses. The following year the Romans used a wide variety of siege machinery in an attempt to take the city by storm, though no particular engines are specified. The Romans succeeded in breaking down a short stretch of the outer circuit wall despite vicious counter-attacks by the inhabitants who hurled down stones and naphtha and used very powerful artillery, some of which seem to have been capable of firing two missiles simultaneously. Severus had watched the assault from a tribunal and gave the Hatrenes an opportunity to surrender following the breaching of the outer wall. However, according to Dio, the besieged rebuilt the wall and when Severus ordered another assault his army mutinied. As a result of this he abandoned the siege.

Date: c.AD 256
Place: Dura Europos
Refs: Ed. Rostovtzeff, Reports of Excavations at Dura

B: Dura is situated on the Euphrates about 150 miles east of Palmyra. This important Roman garrison town was captured by the Persians under Shapur in, or shortly after, AD 256. The siege is not mentioned in the literary sources and the archaeological evidence is by no means full but some events of the siege are clear. The Romans made preparations in case of a siege, including strengthening the city walls by building sloping earth embankments against the walls on both the inside and outside. The inner embankment was later widened to reinforce it further.

It seems probably that the Persians would first have attempted to take Dura by assault but would have been impeded by the high walls and artillery fire, including incendiary missiles from the towers. Several attempts were made to undermine the walls. One mine was directed at a tower near the Palmyrene gate on the S.E section of the walls. The Persians undermined the tower and part of the adjacent curtain wall and underpinned both with timber. The Romans dug a countermine to prevent the undermining and destruction of the wall and when the two mines met there was a skirmish underground. The Romans retreated and blocked up the countermine, trapping some of their companions. The Persians then completely obstructed the countermine and fired their mine using pitch, possibly sulphur, and straw. A section of the wall and tower collapsed but the Persians do not seem to have been able to enter the city here.

The Persians also carried out operations against the S.W wall of the city. A very narrow mine over 40 m long was dug from the edge of a ravine to the S.W corner tower. The mine was widened out near the foundations of the tower and these foundations were almost completely undermined and underpinned. A short ventilation tunnel was built and when the mine was fired this tower was almost completely destroyed. Rostovtzeff believed that this tower was destroyed so that the Persians working on the siege ramp further along the wall would not be exposed to missile fire. The Persian ramp against the south wall was built of brick, earth and debris from tombs, and the Romans increased the height of the walls and seem to have undermined the ramp causing it to collapse. It seems likely that the siege was fairly long considering the great efforts the Persians took. The city was finally captured and sacked but the excavations have not shown how it was taken.

Date: AD 278
Place: Cremna, Anatolia
Refs: Zosimus I 69-70
Mitchell & Waelkens Anatolian Studies 1987 & 1988

A: The town of Cremna was held by a group of brigands under the command of Lydius and Roman troops were sent to capture him. Cremna was strongly fortified and the Romans seem to have blockaded the place. Lydius expelled the young and old from the town because of shortage of supplies and when the Romans sent them back Lydius hurled them into the ravines which surrounded the town. He also had a tunnel dug to bring in supplies from beyond the Roman camp. When the famine became worse Lydius killed everyone in the town, leaving just enough to defend it.

Cremna was eventually taken when Lydius punished his most accurate artilleryman for missing his target. This man went over to the Romans and shot Lydius with a catapult as he looked through a loophole in Cremna's fortifications. Shortly after Lydius' death the rest surrendered.

B: During excavations in the town of Cremna several features were noted which appear to belong to the siege. The town's fortifications were strengthened in the mid 3rd century and several of the towers on the west wall appear to have been badly damaged in the assault. A series of artillery emplacements to the south of the site may also date to the siege and several large ballista balls have been found both inside and outside the defences.

Two rough stone walls along the crest of the ridges facing the city's western defences may be part of the Roman blockading lines; the front wall, facing the town, had stone towers attached to it and sallyports. Some traces of Roman encampments have been found and the site of the Roman HQ has been tentatively identified by the discovery of an inscription to the Emperor Probus dating to this year immediately to the rear of the second line of blockading walls and beside the Roman road. This inscription also mentions Terentius Marcianus who may have commanded the operations (IGR 3 434, 358).

On the west side of the town are also the remains of what is probably a Roman siege mound c.140 m long and at least 23 m high. The defenders appear to have attempted to counter this by constructing a mound inside the town wall opposite the Roman mound. Both sides may have used their mounds as artillery platforms. The archaeological evidence suggests that the field operations were more extensive than Zosimus implies.

Date: AD 359
Place: Amida (Diyarbakir, Turkey)
Refs: Ammianus XIX 1

Amida, situated on the upper reaches of the Tigris was in Sapor's line of march. For two consecutive days the Romans were asked to surrender which they were expected to do. However the Romans opened fire on the Persians who approached, so they resolved to destroy the city. The Persians' first attempt was by direct assault, including the use of captured Roman artillery but they were driven back by artillery and other missiles. Amida was then surrounded by sheds and mantlets (vineae et pluteii) and siege ramps and towers were constructed. The towers were protected by iron plates and had artillery on top to drive the defenders from the walls. Some of the Roman soldiers made reckless sorties so the gates were blocked up. At one point Persian archers entered the city through underground tunnels and took possession of a tower. When the Persian forces attacked the Roman defenders were fired on from this tower so they brought artillery to bear on the tower and opened fire, causing serious casualties.

As the Persian siege ramp grew the Romans inside constructed earthworks to increase the height of the walls. In one incident Gallic troops made a night sortie but got into difficulties and the Romans seem to have fired catapults with no ammunition so the Persians would be frightened by the noise. The

Persians finally decided to take Amida by storm and brought up their siege towers which drove the defenders off the walls. The Romans brought onagri to bear on the towers, destroying them and dislodging the artillery.

Both sides continued to raise their earth mounds but eventually the Roman one subsided, creating a passage from the wall to the earth bank over which the Persians gradually advanced and took the city, presumably after breaching the outer wall of Amida. According to Ammianus the Persians slaughtered the Romans but he escaped.

Date: AD 360
Place: Singara (Beled Sinjar, Iraq)
Refs: Ammianus XX 6

The town, situated in Mesopotamia, was held by two legions and other units and was besieged by Sapor during an advance through Roman territory. As the Persians approached the inhabitants prepared missiles and artillery and posted themselves along the walls. Sapor gave the inhabitants several days in which to surrender, then made a direct assault on all parts of the town using scaling ladders and siege engines. Meanwhile the main body of his force began to undermine the walls under the protection of penthouses and mantlets (vineae & pluteii). The Romans fired a variety of missiles at the miners.

The fighting continued indecisively for several days with heavy losses on both sides. Finally the Persians brought up an exceptionally powerful ram and attacked a round tower which had recently been rebuilt after being breached in a previous siege. The Romans tried to burn the ram with incendiary missiles and both sides kept up fierce fire with bows and slings but the Persian ram was very effective in the joints of the newly built wall where the mortar was still damp and the tower collapsed. The Persian troops entered the town. A very small number was killed indiscriminately and the rest, including the soldiers, were transported to remote parts of Persia.

Date: AD 360
Place: Bezabde I
Refs: Ammianus XX 7

Bezabde was a very strong fortress on the upper reaches of the Tigris. On the side facing the river the low ground was protected by a double wall. Sapor gave the town a day to surrender, then his troops advanced with

scaling ladders and for the next two days both sides suffered heavy losses in the fighting. After a one day truce the Persians tried to bring rams up the narrow paths and were opposed by very heavy fire from bows and artillery which also fired blazing wicker baskets smeared with pitch and bitumen. The Persian engines came to a halt under the fire and were burnt by the incendiary devices.

Despite heavy losses the Persians were keen to take the town quickly and during the struggle the exposed themselves to extreme danger. One of the Persian rams was covered with soaked hide and was therefore less likely to be damaged by the Roman missiles. It was used against a weak tower and a weak stretch of the wall. When this collapsed the Persians rushed into the town. After fighting at close quarters the Romans scattered. A massacre and looting followed, though many prisoners were also taken.

Date: AD 360
Place: Bezabde II
Refs: Ammianus XX 11

The Persian garrison was given an opportunity to surrender but this was rejected. The Romans attempted to take the town by storm using a testudo formation and scaling ladders but were driven back. Roman penthouses were destroyed by missiles including millstones and chunks of column. After ten days the Romans brought up a massive ram which the Persians had used at Antioch. This was protected by a very strong mantlet but could not make an impact under heavy artillery fire.

Roman earthworks were built to enable the rams to be used effectively and when these were brought into action the Persians fired various incendiary missiles at them but in vain as the beams were elaborately protected from fire. When the great ram was about to destroy a tower the Persians caught its head in a noose and then poured down boiling pitch, forcing the Romans to retreat. The Persians then sallied and burnt nearly all the siege engines. When the siege ramps overtopped the walls, artillery fire kept the defenders off the walls while the Romans attacked in three divisions, using a ram against one of the towers. Again the Romans were repulsed and despite being hard pressed the Persians sortied and burnt one of the Roman siege mounds which was made of wood, rushes and cane.

Constantius decided to resort to blockade to starve the Persians out but with the approach of winter he abandoned the siege after suffering severe losses.

Date: AD 361
Place: Aquileia
Refs: Ammianus XXI 12

Aquileia was seized by supporters of Constantius so Julian sent a force to take it although it was known to have survived several sieges without ever being destroyed or surrendered. The defenders were given an opportunity to surrender and when they refused Julian's forces advanced under the protection of penthouses and closely woven hurdles (pluteii et cratesque densius textas) and tried to undermine the walls but an assault was repulsed. With the failure of the frontal assault the besiegers transferred their efforts to a regular siege.

The town's position by a river ruled out the use of rams or mines so the besiegers constructed wooden towers placed on platforms of three ships fastened together. Soldiers on top of the tower kept the defenders off the walls whilst light armed troops at a lower level crossed on gangways and tried to breach the wall. As the towers approached they were showered with a variety of incendiary devices and the towers fell into the river. The following day direct assault was again tried and the besiegers tried to break down a gate, but were forced to retire in the face of fire and missiles.

When the besiegers were unable to find a weak spot to take the city by direct assault or with engines they began to prosecute the siege with less energy. Attempts were made to force Aquileia to surrender by cutting the aqueducts and diverting the river but the town did not surrender until it heard that Constantius was dead.

Date: AD 363
Place: Pirisabora
Refs: Ammianus XXIV 2
Zosimus 3 17-19
Libanius Or.xviii 227-228

This was a town on the lower reaches of the Euphrates which Zosimus describes in detail. It was enclosed by two circular walls and on the north side it was further protected by water diverted from the river whilst on the eastern side there was a deep ditch, a palisade and towers. The citadel had

its own walls of bitumen and baked brick. When the Persians made as if to surrender but didn't, Julian brought up siege engines and filled in the trenches then breached a corner tower with a ram. The defenders then abandoned the outer walls and fled to the citadel. The Romans fired artillery and set up siege engines, then attacked the gate under the protection of a testudo formation but were forced to retreat. Julian next attempted to undermine the gate and then built a helepolis siege tower. When this approached the Persians surrendered. 2500 prisoners were taken and Zosimus states that they were given safe conduct through the Roman lines.

Date: AD 363
Place: Maozamalcha
Refs: Ammianus XXIV 4
Zosimus 3 20-22
Libanius Or.xviii 235-41

Maozamalcha stood on a hill less than 50 miles west of Ctesiphon and was fortified with two walls and 16 towers, surrounded on all sides with a deep ditch which at one point was filled with water. Julian moved his camp to a suitable position to conduct the siege and fortified it with a doubt rampart. When the town, which was held by a picked garrison, refused to surrender, the Romans filled in the ditches, built ramps, set up artillery and began a mine up to the town. The Romans also attacked in testudo formation but came under fire from slingers, archers, stones, flares, fire bombs and artillery and were forced to withdraw.

Julian was forced to concentrate on devices to protect his forces from the missile attacks. Meanwhile his officers broke down a section of the wall or a gate with a ram and a fierce fight followed. The next day a replacement team of miners completed their work just as the ram breached another gate. During a night attack, the Romans made a diversionary assault on the walls while the sappers entered the town. The Romans overran the town, slaughtered the population because they did not want to take prisoners, plundered it and razed it to the ground.

Date: AD 378
Place: Adrianople
Refs: Ammianus XXXI 15

The Goths were eager to take Adrianople after the battle nearby because they had heard there was treasure there. They surrounded the city and made a

direct assault on all sides. When this failed the Goths ordered the city to surrender but the Romans refused. Measures of defence included blocking gates, strengthening weak parts of the wall, setting up artillery in suitable places and storing water. The Goths tried to take the city with the help of Roman traitors and when this failed tried direct assault again. As the Goths were re-using Roman missiles, the Romans ordered the cords fastening the barbs to arrow shafts to be partly severed so they could not be reused.

During the assault the Goths came under heavy and accurate Roman fire and their attempts using scaling ladders were foiled by the Romans throwing down stones and masonry, including column drums. Because of their lack of success the Goths became less interested in the siege and eventually abandoned it to go after easier loot.

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