CRUSADER ARTILLERY, 1097-1148: TYPOLOGY, TERMINOLOGY AND CHARACTER.

A DISSERTATION FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

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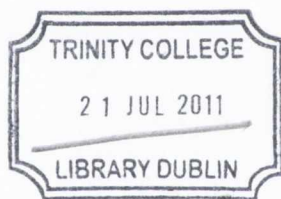
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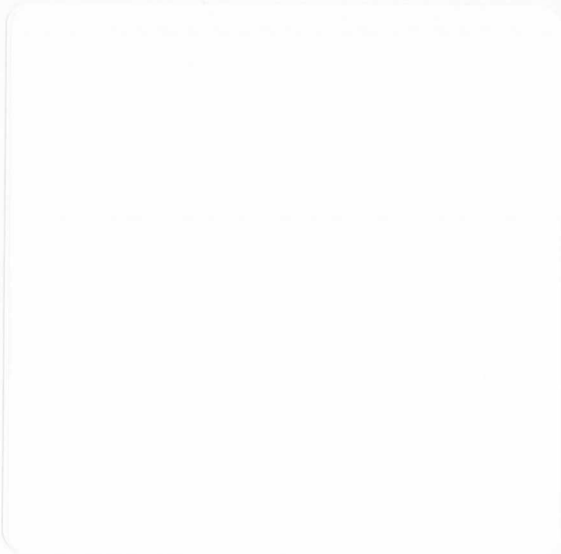
SUMMARY

This thesis aims to investigate the use of artillery in the crusades and the crusader states for the period starting with the 1097 siege of Nicaea and ending with the siege of Damascus in 1148. In this forty-nine year period there are accounts of artillery use at thirty-five sieges as well as mentions of artillery at a number of other events – such as the civil strife that took place in Edessa while Baldwin of Boulogne was taking control of the city and during the planning of an assault on Sidon in 1106 that never took place. This large number of incidents provides a rich mine of information on the nature of artillery in the late eleventh and early twelfth centuries, information which is far richer in accounts of the crusades than it is in the accounts of contemporary events in Western Europe.

The thesis is split into two distinct sections. The first section of the work, comprising approximately one third of the whole thesis, is concerned with the sources used. Each of the authors of the major sources for the period covered is introduced in turn and his artillery terminology is analysed in detail. The second of the two chapters in the sources section is a shorter survey of the artillery terminology evident in some of the major sources of Western Europe in the same general period. This attempt to identify any possible regional systems of terminology in Europe serves to investigate possible influences on the terminology employed by the crusade authors that are the main focus of this study. The chapter on Western Europe shows clearly that there is far less of a focus on artillery in the European sources and, consequently, there is little in those narratives to influence the crusade chronicles. That chapter, however, exhibits evidence of a specific German system of artillery terminology. The first section of the study also sheds light on a number of issues regarding the crusade sources and the relationships between those sources. For example, the manner in which William of Tyre used other primary sources in writing his *Historia* is telling, since he not only mined those sources for information but edited them both in the terminology he used for artillery and in the spelling and grammar of that terminology.

The second section consists of a series of case studies presented chronologically. Each case study comprises a single incident involving the use of artillery and opens with the presentation of all the available evidence on that incident from the narrative sources. These are presented in a parallel format to allow for comparison. The presentation of the evidence is followed by an analysis of that evidence and a consideration of the issues that it presents. Contradictions and similarities between the various works are taken into account, as are the issues raised in the first section of the thesis about the relevant authors. These case studies tease out many issues surrounding the nature of artillery use in the crusades, focusing on the terminology, typology and effectiveness of those machines. This allows for the discussion of those issues with a level of detail not before applied to this area of study. The analysis of every instance of artillery use and the comparison of the terminology applied by the authors to the artillery they described with the ancillary detail provided about the uses of those machines permits conclusions to be reached in a more concrete and well-founded manner than previous, more general studies of medieval artillery have found possible.

This section of the thesis contains a number of findings. The most concrete of these conclusions is the identification of traction trebuchets in the crusader batteries at the 1099 siege of Jerusalem. Furthermore, working from an analysis of the patterns of terminology use by the crusade narratives this work argues that *balistae* in their classical form are likely to have been present in the course of the early parts of the First Crusade, primarily the sieges of Nicaea and Antioch, and might also have been used in later years. Associated with the conclusions reached regarding *balista* use is the conclusion that a number of the primary sources for the crusades made use of the term *balista* in a manner that unquestionably ties the word to artillery. This is in contrast to evident European military terminology in which the interpretation 'crossbows' seems to generally be more appropriate than artillery when contending with the word *balistae*. The thesis also carefully charts developments in the effectiveness of artillery in this period as well as the changing attitude towards artillery exhibited by the era's military leaders as those machines became more central elements in siege warfare.

ACKNOWLEDGEMENTS

CONTENTS

ABBREVIATIONS

AA – Albert of Aachen, *Historia Ierosolimitana.* ed. Susan B. Edgington (Oxford, 2007).

Anselm of Ribemont – *Epistula II Anselmi de Ribodimonte ad Manassem archiepiscopum Remorum*: H. Hagenmeyer, *Epistualæ et Chartæ* (Innsbruck, 1901, New York, 1973), pp. 156-60.

BD – Baldric of Dol, *Baldrici, episcopi Dolensis, Historia Jerosolimitana*, RHC Occ 4, 1-111.

De Expugnatione Lyxbonensi - *De Expugnatione Lyxbonensi*, ed. C. W. David (New York, 1936, reprinted 2001).

FC – Fulcher of Chartres, *Historia Hierosolymitana*, ed. Heinrich Hagenmeyer (Heidelberg, 1913).

FC, McGinty – Fulcher of Chartres, *Chronicle of the First Crusade, Fulcheri Carnotensis Historia Hierosolymitana*, ed. Martha Evelyn McGinty (London, 1941).

FC, Patrologia – Fulcher of Chartres, *Fulcherii Carnotensis Historia Hierosolymitana Ab anno 1095 ad annum usque 1127*, Patrologia Latina 155 (1854), col. 823-942.

FC, Ryan – Fulcher of Chartres, *A history of the expedition to Jerusalem, 1095-1127*, trans. F. R. Ryan, ed. Harold S. Fink. (Knoxville, 1969).

GF – *Gesta Francorum et aliorum Hiersolimatanorum*, ed. Heinrich Hagenmeyer (Heidelberg, 1890).

GF, Hill – *Gesta Francorum, The Deeds of the Franks and the Other Pilgrims to Jerusalem*, ed. Rosalind Hill (Oxford, 1962, reprinted 2002).

GN – Guibert of Nogent, *Dei Gesta per Francos et cinq autres textes*, ed. R. B. C. Huygens (Turnholt, 1996) *Corpus Christianorum, Continuatis Medievalis* 127 A.

GN, Levine – Guibert of Nogent, *The Deeds of God through the Franks, Gesta Dei per Francos*, ed. Robert Levine (Woodbridge, 1997).

PL – *Patrologia Latina*, ed. J.-P. Migne (Turnhout, 1844-1855).

PT – Peter Tudebode, *Historia de Hierosolymitano itinere*, in *Recueil Des Historiens Des Croisades, Historiens Occidentaux, 3* (Paris, 1866), pp. 3-119.

PT, Hills – Peter Tudebode, *Historia de Hiersolymitano itinere*, ed. John and

Laurita Hill (Philadelphia, 1974).

RC – Ralph of Caen, *Gesta Tancredi in expeditione Hiersolymitana*, in *Recueil Des Historiens Des Croisades, Historiens Occidentaux 3* (Paris, 1866), pp. 603-716.

RC, Bachrachs – Ralph of Caen, *The Gesta Tancredi of Ralph of Caen, A history of the Normans on the First Crusade*, ed. Bernard S. Bachrach and David S. Bachrach (Aldershot, 2005).

Rd'A – Raymond d'Aguilers, *Historia Francorum qui ceperunt Iherusalem*, ed. John France, *Critical Edition of the Historia Francorum of Raymond of Aguilers*, unpublished Phd thesis, University of Nottingham (1967).

Rd'A, Hills – Raymond d'Aguilers, *Historia Francorum qui ceperunt Iherusalem*, ed. John Hugh Hill and Laurita L. Hill (Philadelphia, 1968).

RHC, Occ – *Recueil des Historiens des Croisades, Historiens Occidentaux*, 5 vols (Paris, 1844-95).

RHC, Or - *Recueil des Historiens des Croisades: Historiens Orientaux*, 4 vols (Paris, 1872-98)

RM – Robert the Monk, *Historia Iherosolimatiana*, in *Recueil Des Historiens Des Croisades, Historiens Occidentaux 3* (Paris 1866), pp. 719-882

RM, Sweetman – Robert the Monk, *Robert the Monk's History of the First Crusade, Historia Iherosolimitana*, ed. Carol Sweetman (Aldershot, 2005).

Stephen of Blois – *Epistula I Stephani comitis Carnotensis ad Adelam uxorem suam*: H. Hagenmeyer, *Epistulae et Chartae* (New York, 1973), pp. 138-44.

Vegetius – Vegetius, *Epitoma rei militaris*, ed. M. D. Reeve (Oxford, 2004).

WT – William of Tyre, *Willelmi Tyrensis archiepiscopi Chronicon*, ed. R.B.C. Huygens, Corpus Christianorum Continuatio Mediaevalis, 58 and 58 A (Turnholt, 1986).

WT, Babcock & Krey – William of Tyre, *A History of Deeds Done Beyond the Sea*, trans. Emily A. Babcock and A.C. Krey, 2 vols (New York, 1943).

INTRODUCTION

There are no modern monographs on medieval artillery. While areas of debate concerning the history of that artillery abound, there is little consensus among the historians involved. There are several laudable investigations into medieval artillery but, for the most part, they consist of articles or sections of books that either are quite limited in scope or are very broad ranging but presented in a small-scale format that does not allow for detailed discussion. One example of a respectable work that is too broad ranging to deal with matters in sufficient detail is Rogers's *Latin Siege Warfare in the Twelfth Century*. Covering a century of siege warfare in 250 pages, it is impossible to deal with any one aspect of that warfare in as much detail as one might like. It is also worth noting that neither that work nor others in the field of medieval military history make a direct or concerted attempt to contend satisfactorily with the terminology of the medieval artillery.

Although recent historiography has contributed much to the understanding of warfare in the time of the crusades, particularly with regard to the practicalities of warfare, historically most of the works on the broader area of medieval military history, like the medieval sources themselves, eschewed examinations of sieges and artillery, choosing instead to favour the more glamorous and supposedly glorious pitched battles.[1] This approach is understandable given that the source material for

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[1] For works on the practicalities of warfare see: J. France, *Victory in the East: a military history of the First Crusade* (Cambridge, 1994); A. V. Murray, 'Money and Logistics in the forces of the First Crusade: Coinage, Bullion, Service and Supply, 1096-99,' in J. H. Pryor, ed., *Logistics of Warfare in the Age of the Crusades*, (Ashgate, 2006), pp. 229-249; M. Prestwich, *Armies and Warfare in the Middle Ages, the English experience* (New Haven and London, 1996); all the essays in the collection J. Pryor, ed., *Logistics of Warfare in the Age of the Crusades* (Aldershot, 2006) but particularly: B. Bachrach, 'Crusader logistics: from victory at Nicaea to resupply at Dorylaion', pp. 43-62, J. France, 'Logistics and the Second Crusade',

military history contains the same concentration and thus more evidence is available for studies of that sort. It has long been recognised, however, that it was sieges, rather than battles, that made the greater impact on the course of wars and, as a result, more attention needs to be directed at the nature and methods of siege warfare.

The chronology and geography of the development of artillery is perhaps the most important area of discussion for those researching artillery. The exact dates of the appearance and possible disappearance of various types of artillery in various geographical areas is debatable but must be settled for the sake of research into other facets of this area. Probably the best-accepted time line is that associated with the traction trebuchet. There is consensus that it was developed in China in the fourth or fifth century B.C.[2] It is clear that the weapon arrived in Europe well before the advent of the crusades. Gillmor has identified the use of such machines in the 885-6 siege of Paris, while Chevedden, Shiller, Gilbert and Kagay point to the hybrid trebuchet being in use in the Latin West by the second half of the ninth century.[3] Lynn White Jr., on the other hand, has argued in a now somewhat dated article that no 'beam-sling' artillery can be shown definitively to have been used in Europe before 1212.[4] The particulars of the evolution and spread of these machines is not pertinent to this discussion, however, and it must suffice to recognise that there is now consensus that they were present in Europe long before the latter years of the eleventh century and, consequently, there should be little doubt that they were available to the crusaders. That is not to say, however, that they were

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pp. 77-93, B. Z. Kedar, 'Reflections on maps, Crusading, and logistics,' pp. 159-83, A. V. Murray, 'Money and logistics in the forces of the First Crusade: coinage, bullion, service, and supply, 1096-99', pp. 229-49.

[2] J. Needham, 'China's Trebuchets, Manned and Counterweighted', in B. S. Hall and D. C. West, eds., *On Pre-Modern Technology and Science: Studies in Honour of Lynn White, Jr.* (Malibu, 1976). Needham's conclusions are repeated by important works such as P. E. Chevedden, Z. Shiller, S. R. Gilbert, and D. J. Kagay, 'The traction trebuchet: a triumph of four civilisations,' *Viator* 31 (2000), p. 439.

[3] C. Gillmor, 'The introduction of the traction trebuchet into the Latin West,' *Viator* 12 (1981), *passim*. P. E. Chevedden, Z. Shiller, S. R. Gilbert, and D. J. Kagay, 'The traction trebuchet: a triumph of four civilisations,' *Viator* 31 (2000), p. 443.

[4] L. White Jr., 'The Crusades and the Technological Thrust of the West' in V. J. Parry and M. E. Yapps, eds., *War, Technology and Society in the Middle East* (Oxford, 1975), p. 103.

definitely present at the sieges conducted by the crusaders: further evidence from the sources is necessary before making any such claims.

There are, however, more controversial elements of the development of medieval artillery than the traction trebuchet. An approximate date for the introduction of the counterweight trebuchet is perhaps the greatest bone of contention in this area of study. Possible dates abound. Chevedden has pointed to an 1187 illustration and accompanying text in a military manual composed for Saladin, *Tabsirah fī al-hurūb* by Tarsūsī, as 'the earliest full-length description and illustration of a counterweight trebuchet.'[5] This strong evidence – a unique illustration of a counterweight trebuchet in the twelfth century – provides a *terminus ante quem* for the invention of the counterweight trebuchet. Another of Chevedden's assertions in the same article – that the 1097 siege of Nicaea or soon after offers a likely date for the invention – is more problematic. This conclusion is such that it cannot be ignored but, as it is mainly based on evidence gleaned primarily from Anna Comnena's non-contemporary, highly biased source, its confirmation is awkward.[6] He identifies a number of issues that may indicate the emergence of this new, more powerful machine in the early decades of the twelfth century and, consequently, he is of the opinion that the counterweight trebuchet was known in Outremer by the 1120s.[7] His proposal that the 1097 siege of Nicaea should be seen as the date of the development of the counterweight trebuchet provides the earliest date postulated by historians for the dawn of the counterweight age but it is far from alone as a possible date: the sieges of Lisbon in 1147, Tortona in 1155, Zevgminon in 1165 and the 1199 siege of Castelnuovo Bocca d'Adda have all been posited by various historians as either the first date or as early evidence for the development.[8] There is no consensus on this matter.

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[5] P. E. Chevedden, 'The invention of the counterweight trebuchet: a study in cultural diffusion,' *Dumbarton Oaks Papers* 54 (2000), pp. 87-90, 115-6.
[6] *Ibid.*, pp. 76-86.
[7] *Ibid.*, *passim*, for Chevedden's general timeline of the development of the machine see *Ibid.* pp. 104-5.
[8] J. Bradbury, *The Medieval Siege* (Woodbridge, 1992) p. 260; D. Nicolle, *Medieval Siege Weapons, Western Europe AD 585-1385* (Oxford, 2002), p. 19; K. DeVries, *Medieval Military Technology* (Ontario, 1998), p. 138; K. Huuri, 'Zur Geschichte des mittelalterlichen Geschützwesens aus orientalischen Quellen', *Studia Orientalia*

The role of the hybrid trebuchet in the development of medieval artillery provides a further issue for discussion. Chevedden, Kagay and Padilla argued that the hybrid trebuchet was a halfway point in the development from the traction trebuchet to the counterweight variety.[9] Basista, on the other hand, argued that these machines would be better termed as counterpoise trebuchets and that the use of weight in conjunction with human power should be seen as an improvement of the preceding design but not as a half way step toward the more powerful counterweight machine.[10] This issue, pertaining to the internal thought processes of the medieval engineer, is unlikely to be solved here. The nature of the sources examined in this investigation is such that there are no passages with sufficient levels of detail on artillery and its development to allow one to identify small differences such as those differentiating the traction from the hybrid trebuchet. The character of the sources is also such that they shed no light on the thought processes involved in that development.

Alongside those debates is another, centering on the extent of the continuation of classical artillery forms such as the *balista* into the Middle Ages. The artillery of the ancient world primarily utilised torsion power to throw missiles. These engines required more sophisticated mechanisms and engineering than traction or counterweight machines as the tension in ropes and sinews had to be set and maintained and it has been questioned whether medieval engineering was up to this task.[11] It is this question that engaged much of the earlier investigations into artillery. Whereas Köhler argued for the continuation of torsion machines into the Middle Ages, Schneider contended that there was a break between the classical and

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9, 3 (Helsinski, 1941), p. 64 and Chevedden, 'The Invention of the Counterweight Trebuchet', p. 76.

[9] P. E. Chevedden, D. J. Kagay, and P. G. Padilla, 'The Hybrid Trebuchet: The Halfway Step to the Counterweight Trebuchet,' in D. J. Kagay and T. M. Vann, eds., *On the Social Origins of Medieval Institutions: Essays in Honor of Joseph F. O'Callaghan*, (Leiden, 1998), *passim*.

[10] M. Basista, 'Hybrid or Counterpoise? A Study of Transitional Trebuchets,' *Journal of Medieval Military History*, 5 (2007), *passim*.

[11] J. Bradbury, *The Medieval Siege*, pp. 250-1.

medieval worlds.[12] This particular issue is central to this work, as classical terminology abounds in the crusade narratives and the interpretation of those terms is both crucial and unavoidable.

The twelfth century is, in a sense, the key to many of these debatable isssues. The majority of the dates that have been suggested for the earliest appearance of the counterweight trebuchet are in the late twelfth century. It would seem, therefore, almost certain to have been developed in the course of that century. Classical forms of siege equipment have been unequivocally stated by some to have continued as late as the tenth century in Byzantium and to have been 'undoubtedly employed, and employed with effect, at every siege.'[13] As these machines are deemed, in some quarters at least, to have survived as late as the tenth century, their use remains a possibility for the late eleventh and twelfth centuries. Furthermore, one of the key elements that recur during discussions of the development of artillery is the importance of cross-cultural transfer of ideas. The crusades, a key period in which cultures violently clashed, must be investigated for any developments brought about through the cross-cultural volatility of the times. Although detailed discussions of military elements of the crusade movement have been carried out already – the works of John France and R.C. Smail stand out – there has been no concentration in the historiography on the use or development of artillery.[14] This study aims to rectify that for the early years of the crusade movement up to the Second Crusade.

To achieve this, a throrough investigation of all the accounts of the early years of the crusading movement has been carried out. Stephen Turnbull took a

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[12] G. Köhler, *Die Entwicklung des Kriegwesens und der Kriegführung in der Ritterzeit von Mitte des 11. Jahrhunderts bis zu der Hussitenkriegen*, III (Breslau, 1890), pp. 140-221; R. Rogers, *Latin Siege Warfare in the Twelfth Century* (Oxford, 1992), p. 257; R. Schneider, *Die Artillerie des Mittelalters* (Berlin, 1910, reprinted 1985), pp. 10-16.

[13] C. Oman, *The Art of War in the Middle Ages* (Oxford, 1885, revised edition, Ithaca and London, 1960), p. 55. Oman makes that point here but does so without providing precise evidence.

[14] J. France, *Victory in the East*; J. France, 'Crusading Warfare,' in H. Nicholson, ed., *Palgrave Advances in the Crusades* (London, 2005), pp. 58-80; *Western Warfare in the Age of the Crusades, 1000-1300* (London, 1999); R. C. Smail, *Crusading Warfare 1097-1193* (New York, 1995).

similar approach, albeit with a more limited scope, in his investigation of the use of the term *balista* in Henry of Livonia's thirteenth-century chronicle of the Baltic crusades.[15] This study convincingly exhibited how Henry of Livonia used the term *balista* to refer to crossbows rather than to artillery pieces – this conclusion, based on the evidence from an investigation solely of Henry of Livonia's work, cannot, however, necessarily be applied to other sources. The Middle Ages lacked a uniform approach to terminology in any sphere and, as shown by Turnbull's article, a reliance on terminology at face value is fruitless when looking to identify the type and nature of artillery. For example, some of the issues associated with the interpretation of medieval terminology are evident in a short passage in Rogers' work on medieval siege warfare in which William of Tyre's use of the terms *tormentum* and *mangana*. In one section of William's work, Rogers identifies William as pinpointing size, rather than propulsion method, as the key difference between these two artillery types.[16] This analysis of the terminology, though logical, leaves something to be desired, however, as the section of William of Tyre's work invoking the term *mangana* is reliant on the work of Albert of Aachen and, consequently, cannot be seen as his own.[17] The point is not to denigrate the conclusions of that section of Rogers' work but rather to demonstrate the dangers inherent in dealing with these interlinked sources. The terms involved here are problematic and any effort to understand them requires an in-depth investigation of all instances of their usage and the context in which each author who used those terms wrote.

The only way to overcome the probems presented by this issue is through investigations such as that of Turnbull that allow for the understanding of the minutiae of an author's approach to artillery. Through comparing and contrasting the various accounts of each of the crusade narratives it is possible to tease out a sense of the nature of artillery use without a reliance on one author. This frees the investigation somewhat from the inherent geographical, educational and social prejudice associated with each medieval author as an individual. Detailed

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[15] S. Turnbull, 'Crossbows or Catapults? The Identification of Siege Weaponry and Techniques in the Chronicle of Henry of Livonia,' in A. V. Murray, ed., *The Clash of Cultures on the Medieval Baltic Frontier* (Farnham, 2009), pp. 307-20.
[16] R. Rogers, *Latin Siege Warfare in the Twelfth Century*, p. 266.
[17] See below 'William of Tyre', pp. 89-90.

investigations of this sort, operating on a set period and area allow for a comprehensive understanding of artillery at that limited point. Any attempt to cover the development of artillery over a long period in a journal article that is, by necessity, relatively short will be somewhat problematic. This approach tends to create a study that points primarily to the exceptional incidents in the historical records without taking into account associated events that may be mundane but which offer crucial context to the more glamorous incidents. Naturally, as the more exciting events were afforded most attention by the medieval writers they are the ones for which the most detail is available. As a result, such incidents are accorded more space in this thesis than others with less detail but one must also strive to derive all possible pieces of information from those other, less significant events – they are crucial to understanding how these machines operated normally and in showing whether or not the standout events were representative.

In investigating these matters, this thesis is divided into two sections. The first of these sections examines the sources that have been used. Initially the background of the authors of each of the major narratives detailing events in Outremer is looked at and the biographies of those authors are inspected to identify all discernable influences on their work. Further to this, the terms those authors used to denote artillery will also be examined to establish if there is any pattern or system of terminology evident for any particular author. The first section of the thesis will then proceed with a brief investigation into the patterns and trends in the artillery terminology employed by non-crusade narrative of the twelfth century. By examining these western European sources this inquiry aims to detect possible regional systems of artillery terminology that may have existed and influenced the authors who wrote about the crusades. The second part of this work consists of a series of case studies presented chronologically in two chapters: one covering the events of the First Crusade until the 1099 siege of Jerusalem and the second proceeding from that point until the failed 1148 siege of Damascus at the end of the Second Crusade. These case studies differ from the examination carried out in the sources section as, instead of dealing with each author separately, every case study gathers all the appropriate primary source material for a particular incident involving the use of artillery and places them side-by-side before analysing them. In this manner all the evidence for artillery use in the course of crusading warfare from

1097 to 1148 is examined and analysed in detail. As well as examining the sieges that occurred in Outremer, the 1147 siege of Lisbon in Portugal is also examined. This siege, though geographically distant from the others covered in this thesis, is thematically connected to the crusades in that a significant proportion of the besiegers were en route to the Holy Land to take part in the Second Crusade. Furthermore, the extant accounts of that particular siege are uniquely detailed and much can be gleaned about the nature of mid-twelfth century artillery from the descriptions available in those sources.

SECTION 1

PRIMARY SOURCES:

BACKGROUND AND NOMENCLATURE

CHRONICLERS OF THE EARLY CRUSADES, 1096-1148

The primary sources for the First Crusade have been investigated intensively by historians for the purpose of reconstructing events but the reliability of their information regarding military affairs and the influences upon those sections of their accounts is little studied.[1] This section of the thesis offers a detailed examination of the precise terminology used by the individual authors to describe siege machinery and, specifically artillery.

The sources for the First Crusade share a number of traits; the bias of the western narratives is, naturally, in favour of the crusaders. These accounts were mostly written in the aftermath of the great success that the First Crusade represented to Western Christendom. Even the naming of accounts such as the *Gesta Francorum et aliorum Hierosolimitanorum* clearly shows the aim of the authors – to glorify the deeds of the participants in the crusade. These sources have a tendency to sideline the discussion of siege warfare as they display more prominent interests in other areas of crusading warfare such as field battles and heroic acts of bravery. This is perhaps most evident in the descriptions of the siege of Antioch that contain heavy concentrations on the sallies from Antioch by the defenders and resulting battles with the crusaders rather than directly discussing the nature of siege warfare and the artillery used. Consequently, information on siege warfare and artillery is presented by these sources only in an ancillary manner and

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[1] One work that has treated of this matter is J. France, *Victory in the East*, pp. 374-82. It is also touched upon in a general sense in J. F. Verbruggen, *The art of warfare in Western Europe during the Middle Ages: from the eighth century to 1340*, trans. S Willard and S. C. M. Southern (Amsterdam and Oxford, 1977), pp. 10-18. For a discussion of the nature and concentration of the historical works on medieval military history see above, 'Introduction', pp. 5-12.

particulars must be gleaned through detailed, nuanced examinations of narratives that have other concentrations. This focus on battles rather than on the more important sieges is a facet of medieval narratives that has largely been maintained by ninteenth and twentieth-century historians.[2]

THE *GESTA FRANCORUM* AND DEPENDENT SOURCES

The *Gesta Francorum*, as probably the earliest narrative to have been composed, is a crucial source in the study of the First Crusade and the information contained in it provided the framework for many of the other sources of the crusade. These include such eyewitnesses as Peter Tudebode who, in his *Historia de Hiersolymitano Itinere*, followed the *Gesta Francorum* very closely and only changed or added information occasionally. The significant level of interaction between the '*Gesta* family' of sources means that these sources are best discussed alongside one another.[3] In as much as it is possible they shall be dealt with in the chronological order of their writing.

GESTA FRANCORUM ET ALIORUM HIEROSOLIMITANORUM

There are several editions of the *Gesta Francorum et aliorum Hierosolimitanorum*; the earliest published edition was that of Jacques Bongars.[4] There are also editions by B.A. Lees and Louis Bréhier.[5] For the purposes of this thesis, however, Heinrich Hagenmeyer's 1890 edition has been used.[6]

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[2] See above 'Introduction', p. 5.

[3] The term '*Gesta* family' is that used in J. France, 'The Use of the Anonymous Gesta Francorum in the Early-Twelfth Century Sources for the First Crusade', in A. V. Murray, ed., *From Clermont to Jerusalem, The Crusades and Crusader Societies 1095-1500*, (Turnhout, 1998), p. 31.

[4] J. Bongars, *Gesta dei per Francos* (Hanover, 1611).

[5] *Anonymi Gesta Francorum*, B.A. Lee, ed., (Oxford, 1924); *Histoire anonyme de la première croisade,* L. Bréhier, ed. (Paris, 1924).

[6] *Anonymi Gesta Francorum et aliorum Hierosolimitanorum*, H. Hagenmeyer, ed. (Heidelberg, 1890) (hereafter GF).

The anonymous author of the *Gesta Francorum* was an eyewitness to the First Crusade and, originally, a member of Bohemond of Taranto's contingent on the march before leaving that contingent after the siege of Antioch to continue the march on Jerusalem.[7] In the later period of the crusade, it is generally accepted that the author is likely to have been part of Raymond of Toulouse's contingent of the army though Rubenstein sounds a note of caution about this conclusion.[8] It needs to be recognised that the pro-Bohemond bias in the *Gesta* may have had the effect of skewing the information on artillery presented in the work with too strong an emphasis on the machinery employed by Bohemond's forces at the expense of attention to the artillery of other elements in the crusading army.

The *Gesta Francorum* was probably the earliest of the First Crusade narratives. The first nine of the work's ten books were likely to have been written during the crusade itself with the tenth book completed shortly after the fall of Jerusalem, possibly even in the same year, 1099, and certainly no later than 1101.[9] The Anonymous was thus well placed to observe and garner information on the events of the crusade and his account was written very close to the time of those events. As such the *Gesta Francorum* is vital to the understanding of the First Crusade.

The possible role of the author of the *Gesta Francorum* as a knight on the First Crusade is one that requires consideration here. If the author were a knight, the

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[7] On Bohemond of Taranto, see J. Riley-Smith, *The First Crusaders, 1095-1131* (Cambridge, 1997), pp. 9, 17-18, 78-9, 81-2, 87, 99-101, 141, 144-5, 149, 165-6, 171-2, 202, 215, 221, 239-42; J. France, 'The Anonymous *Gesta Francorum* and the *Historia Francorum qui ceperunt Iherusalem* of Raymond of Aguilers and the *Historia de Hierosolymitano itinere* of Peter Tudebode: An Analysis of the Textual Relationship between the Primary Sources for the First Crusade', in J. France and W. G. Zajac, eds., *The Crusades and their Sources: essays presented to Bernard Hamilton* (Aldershot, 1998), p. 56; *Histoire anonyme de la première croisade*, ed. L. Bréhier, p. ii.

[8] On Raymond IV of St Gilles, count of Toulouse, see: J. Riley-Smith, *The First Crusaders*, pp. 9, 19, 43, 45-6, 50, 55-6, 59, 62-4, 86, 96, 104, 106-7, 112, 119, 138, 141, 150, 191-2, 204, 209, 222, 250; J. France, 'The Anonymous *Gesta Francorum* and the *Historia* of Raymond of Aguilers and the *Historia* of Peter Tudebode', p. 56; J. Rubenstein, 'What Is the Gesta Francorum, and Who Is Peter Tudebode?,' *Revue Mabillon* 16 (2005), p. 187.

[9] GF, Hill, p. ix; J. Rubenstein, 'What Is the Gesta Francorum, and Who Is Peter Tudebode?', p. 183.

descriptions of and terminology used for military matters in the *Gesta* would arguably be worthy of more significance in this thesis than those in the sources written by authors with no military background. It was Heinrich Hagenmeyer that first came to the conclusion that the author of the *Gesta Francorum* was a layman.[10] Amongst others, Hill accepted Hagenmeyer's argument that the author was a layman but gave no further evidence to support that conclusion.[11] The two main reasons to believe that the author may have been a layman and either a knight or foot soldier are his use of first person terms in battles and his lack of sophisticated Latin. The appearance of first person pronouns in battles of the First Crusade is, perhaps, the most convincing element of the argument that the *Gesta Francorum* was written by a layman.[12] The phenomenon is exhibited strongly in the crusaders' battle against Kerbogha, atabeg of Mosul, outside Antioch on 28 June 1098.[13] In that case, the Anonymous appears to separate himself from the clerics by describing the actions of that group in third person terminology before then referring to the march of the army with reference to 'we' (*nos*):

> Episcopi nostri et presbyteri et clerici ac monaci sacris vestibus induti nobiscum exierunt cum crucibus, orantes et deprecantes Dominum, ut nos salvos faceret et custodiret et ab omnibus malis eriperet. Alii stabant super murum portae, tenentes sacras cruces in manibus suis, signando et benedicendo nos. Ita nos ordinati et signo crucis protecti, exivimus per portam quae est ante Machomariam.[14]

The lack of strong classical Latin is also suggested as a possible indication of its author having been less educated than one might have expected of a fully trained cleric.[15] In the light of these two arguments many historians have accepted that the Anonymous was a soldier on the First Crusade.

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[10] For Hagenmeyer's discussion of the authorship of the *Gesta Francorum* see GF, pp. 1-10.

[11] GF, Hill, pp. xii-xv.

[12] L. Bréhier, ed., *Histoire anonyme de la première croisade*, p. iii. It is important to note, however, that such an obvious non-combatant as the disabled monk, Herman of Reichenau, would use the first person plural in battle descriptions. See I.S. Robinson, *Eleventh-century Germany: the Swabian Chronicles* (Manchester and New York, 2008), pp. 13, 14, 69, 72.

[13] H. Hagenmeyer, *Chronologie de la Premiere Croisade* (New York, 1973), pp. 175-6.

[14] GF, p. 371.

[15] GF, Hill, pp xiv-xv.

On the other hand, J. Rubenstein, among others, argued against the identification of the author of the *Gesta* as a layman, citing that the first person descriptions could well be stylistic choice and that they were indeed retained by the compiler of the Monte Cassino chronicle, a monk who definitely did not fight in the battles of the crusade.[16] Furthermore, the author's use of scripture could be said to be more sophisticated than argued by those supporting his identification as a layman. This can be seen in a point made by Hill and refuted by Rubenstein regarding the *Gesta Francorum's* use of biblical quotations from Deuteronomy and Joshua.[17] Hill's annotation to her edition of the work states that, due to author's 'rather confused recollection of either Deuteronomy 11: 24-25 or of Joshua 1: 4-5' it can be deduced that he was 'a devout layman, quoting familiar scriptural passages from a good but not completely accurate memory.'[18] Rubenstein, on the other hand counters, reckoning that 'to know Deuteronomy and Joshua well enough to paraphrase and merge them would surely be beyond almost any secular author, not to mention a feat arguably more impressive than quoting them correctly.'[19] This type of stylistic analysis is problematic and subjective, as can be seen from the manner in which two historians, Hill and Rubenstein, took the same information and used it to reach widely differing conclusions on the clerical education of the Anonymous. It is clear that no solid historical conclusions can be based on such flimsy, subjective methods.

It needs to be recognised that if the *Gesta Francorum* is accepted as the work of a layman, then it is an extraordinarily early medieval example of a layman writing a historical account. On the other hand, being educated and literate to some extent was not unknown for noblemen of this period; indeed, Baldwin of Boulogne,

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[16] J. Rubenstein, 'What Is the Gesta Francorum, and Who Is Peter Tudebode?', p.184; *Chronica monasterii Casinensis* IV.11 *MGH Scriptores* 34 (Hanover, 1980), pp. 475-81. On the use of the *Gesta* in the chronicle of Monte Cassino see: J. France, 'The Use of the Anonymous Gesta Francorum in the Early-Twelfth Century Sources for the First Crusade', in A. V. Murray, ed., *From Clermont to Jerusalem*, p. 37.

[17] J. Rubenstein, 'What Is the Gesta Francorum, and Who Is Peter Tudebode?', pp. 187-8.

[18] GF, Hill, p. 54, n. 6.

[19] J. Rubenstein, 'What Is the Gesta Francorum, and Who Is Peter Tudebode?', p. 187.

the first king of Jerusalem, is known to have had clerical training early in his life.[20] This has, at times, been cited to support the possibility that the author of the *Gesta* could have been an educated layman, perhaps a younger son who was being trained for the priesthood for a time.[21] This is, however, an ancillary point. Even if there were no other examples of learned laymen in the late eleventh century, that would not preclude the author of the *Gesta Francorum* from having been one, even if it meant he would be the only recorded one, and, no matter how many examples of educated laymen are put forward, it does not change the fact that for the *Gesta* to have been written by a layman would have been unique. Arguments and counter-arguments on this sub-issue do little to further our understanding of the nature or approach of the author of this crucial work.

It can thus be seen that there is a distinct divide in the historiography surrounding the position of the author of the *Gesta Francorum* in eleventh-century society. Though there is some evidence to suggest that the author was a knight, it can be seen that there are also many reasons to question this possibility. The major problem is the reticence of the author in providing autobiographical information; lacking that information, as we do, the only sensible option is to acknowledge the, arguably remote, possibility that the author of the *Gesta Francorum* was a knight and fighter on the First Crusade march but not to base any arguments on a definitive conclusion that the Anonymous was either a layman or a cleric.

The *Gesta Francorum* has a limited number of references to artillery in its pages. Across all ten books of the work there are only two explicit references and one probable reference to artillery to be found.[22] The work also lacks a clear system of terminology; of the three references mentioned there is no repetition of terms – one use each was made of *funda, instrumentum* and *arbalistae* to indicate the presence or use of artillery. The lack of a larger number of references in the *Gesta*

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[20] J. Riley-Smith, *The First Crusaders*, pp. 18, 63, 70, 93, 96, 171-4, 200, 206, 208; B. Hamilton, *Religion in the Medieval West* (London, 1986), p. 108; C. Kostick, *The Social Structure of the First Crusade* (Leiden and Boston, 2008), p. 13.

[21] J. Rubenstein, 'What Is the Gesta Francorum, and Who Is Peter Tudebode?', p. 183; GF, Hill, p. xiii; K.B. Wolf "Crusade and Narrative", *Journal of Medieval History*, 17 II (1991), pp. 209-14.

[22] GF, p. 182 – *funda*; *Ibid.*, p. 404 – *instrumentum quo iactant lapides*; *Ibid.*, p. 183 – *arbalistae*.

means that one cannot identify a pattern of usage from which deviations could be analysed to provide further information on the terminology; instead what is available from the *Gesta* is three discrete references with no terminology crossover between them. Hill argues that battle order and siege warfare were of particular interest to the Anonymous but the shortage of artillery references in the course of the work suggest that this should not be taken as quite as marked a characteristic of the *Gesta Francorum* as proposed by Hill.[23]

The translation of the terminology in the incidents involving artillery by Rosalind Hill is the final element of the *Gesta Francorum* that must be considered, as it is a clear reflection on the modern interpretation of the machines in question. The *funda*, which was reported throwing heads into Nicaea, was translated as 'a sling' and the *arbalistae* as 'arbalists'; Ma'arrat-an-Numan's *instrumentum quo iactant lapides* was rendered as 'an engine by which they threw great stones.'[24] These translations are all sensible choices of English terms with which to represent the original Latin though none of these Latin terms are particularly complex.

PETER TUDEBODE, *HISTORIA DE HIERSOLYMITANO ITINERE*

Peter Tudebode's *Historia de Hiersolymitano Itinere* is an occasionally crucial source for the study of artillery use in the First Crusade. The exact date of the *Historia de Hiersolymitano Itinere* is unknown but it has been postulated to have been written quite soon after the events it describes.[25] There has been much debate in the past as to which was the derivative text, the *Gesta Francorum* or the

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[23] GF, Hill, p. xiii. That is not to say that Hill was incorrect in stating the author's interest in warfare; for example, the *Gesta Francorum* gives a detailed description of the order of battle prior to the defeat of Kerbogha at Antioch, GF, pp. 368-72.

[24] GF, p. 182; GF, Hill, p. 15; also see below, 'Siege of Nicaea: Heads Thrown into the City', pp. 119-124; GF, p. 183; GF, Hill, p. 15; also see below, 'Siege of Nicaea: Missile Protection for Underminers', pp. 125-129. GF, p. 404; GF, Hill, p. 78; also see below, 'Siege of Ma'arrat-an-Numan: Defenders' machine to attack siege-tower', pp. 167-174.

[25] J. France, 'The Anonymous *Gesta Francorum* and the *Historia* of Raymond of Aguilers and the *Historia* of Peter Tudebode', p. 43.

Historia de Hiersolymitano Itinere. In Heinrich Hagenemeyer's 1886 edition of the *Gesta* the work was convincingly put forward as the original and Peter Tudebode's the derivative.[26] This has since become the established view with little dissension apart from that of John and Laurita Hill, who do not accept the primacy of the *Gesta* and, instead, in their edition of Peter Tudebode's account, postulated that both sources derived from a single lost source.[27] This theory leaves some questions unanswered, however, including why Peter Tudebode, a Poitevin priest, would use *nos* to describe the Italian contingent of the crusading armies.[28] Therefore, the lost-common-source theory has never become widely accepted in crusade historiography and Peter Tudebode's account is largely seen as a derivative of the *Gesta Francorum*, albeit one with additions and revisions.

Though Peter Tudebode was an eyewitness to the First Crusade, the heavy reliance of his account on the *Gesta Francorum* for structure and information means that it is often less than ideal as an independent account for the First Crusade. Despite having sections that do not rely on the *Gesta*, Tudebode's account often follows his source material almost to the word. This can be seen at such events as at the siege of Nicaea when both Tudebode and the *Gesta Francorum* described the measures put in place to defend the men undermining the walls of the city:

Gesta Francorum, p 183:	Peter Tudebode, p. 23:
Denique comes Sancti Egidii et episcopus Podiensis consiliati sunt in unum, qualiter facerent suffodi quamdam turrim, quae erat ante tentoria eorum. Ordinati sunt homines qui hanc suffodiant, et arbalistae et sagittarii, qui eos undique defendant	Comes namque de Sancto Aegidio et Podiensis episcopus consiliati sunt in unum qualiter fecissent fodere quamdam turrim quae erat ante eorum tentoria. Ordinati sunt homines qui hanc fodissent turrim, et arbalistae et sagittarii qui cos defendebant ubique.

The similarities of the two accounts are striking; Tudebode's account made minimal changes to the *Gesta Francorum*. In the given instance, for example, it is pointless

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[26] GF, pp. 1-10; C. Kostick, *The Social Structure of the First Crusade*, p. 23.

[27] PT, Hills, pp. 10-13.

[28] Peter Tudebode is one of the members of the First Crusade identified in J. Riley-Smith, *The First Crusaders*, pp. 94, 217. J. France, 'The Use of the Anonymous Gesta Francorum in the Early-Twelfth Century Sources for the First Crusade', in A. V. Murray, ed., *From Clermont to Jerusalem*, pp. 29-42; C. Kostick, *The Social Structure of the First Crusade*, p. 24.

to attempt an analysis of the terminology employed by Peter Tudebode as the phrase *arbalistae et sagitarii* is a direct extract from the *Gesta Francorum*.

On the occasions where Peter Tudebode's account follows the *Gesta* almost verbatim, the *Historia de Hiersolymitano Itinere* is less useful than at times where it disagrees or adds to the information present in the *Gesta Francorum*. Although the faithful reproduction by Tudebode of the information provided in the *Gesta Francorum* could be seen as demonstrating an inherent agreement with that source material, the point remains that Tudebode's often slavish copying of the *Gesta Francorum* rarely sheds new light on the events described.

The *Gesta Francorum* was not the only work to influence that of Tudebode. Raymond d'Aguilers' *Historia Francorum Qui Ceperunt Iherusalem* also had an impact on Tudebode's *Historia*, although one less pronounced than that of the *Gesta Francorum*.[29] The usage of Raymond's *Historia Francorum* seems to have been restricted to the occasional appropriation of small pieces of information.[30] The elements of Tudebode's work that have been identified as coming from that of Raymond are limited and there is no confirmed instance for which he borrows information on artillery use.

As has been discussed above, the *Gesta Francorum* contains two clear artillery references and one probable reference to artillery pieces.[31] Each of these incidents in the *Gesta's* account was followed closely by Peter Tudebode when he was writing the corresponding sections of his *Historia*. At Nicaea, Peter Tudebode follows closely the descripton in the *Gesta* of the use of *funda* to propel severed heads into the city and the employing of *arbalistae et sagitarii* to defend troops attempting to undermine the walls of the city.[32] Finally, the *Historia* adds little to the *Gesta Francorum's* description of the construction, by the defenders of Ma'arrat-an-Numan, of *instrumentum quo iactabant maximos lapides super*

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[29] J. France, 'The Use of the Anonymous Gesta Francorum in the Early-Twelfth Century Sources for the First Crusade', in A. V. Murray, ed., *From Clermont to Jerusalem*, pp. 31-2.
[30] Rd'A, pp. ccxlv-ccxlix.
[31] See above, '*Gesta Francorum*', p. 19-20.
[32] PT, p. 23; GF, p. 182. PT, p. 23; GF, p. 183.

castrum. Rather Peter Tudebode's wording once more reflects closely that in the *Gesta*.[33] This imitation of the *Gesta* is also manifest in the description of siege engines when artillery is not specifically mentioned. Tudebode, for example, follows the *Gesta* in describing the construction of *instrumenta lignorum, atque turres ligneas* at the outset of the siege of Nicaea.[34]

In examining the terminology of Peter Tudebode it is primarily only necessary to examine that which is his own and not directly inherited from the language of any other work. The number of artillery references in Tudebode's *Historia*, when compared with the references in his base work, the *Gesta Francorum*, shows that Tudebode was only slightly more aware of the presence and use of artillery in the course of the First Crusade as there is only one further reference to artillery in the *Historia de Hiersolymitano Itinere* than in the *Gesta Francorum*. This single additional reference occurs in Tudebode's description of the siege of Jerusalem. Depicting the execution of a captured *Sarracenus* by throwing him from an artillery piece towards the walls of the city, Tudebode's description of the event is backed up, in many details, by Albert of Aachen's account of the siege. The term employed in the *Historia de Hiersolymitano Itinere* to denote this engine is *petrera* (that is, *petraria*), though he does also indicate that the working of the machine included a *funda*.[35] Although this particular incident is crucial for the identification of artillery typology in the First Crusade, there is an undeniable dearth of original references to artillery in Peter Tudebode's *Historia*. This paucity means that there is no visible pattern or system in the terminology employed in the work that can be analysed to provide further information on the nature of artillery in the course of the First Crusade.

The translation of Tudebode's artillery terms by the Hills provides an interesting chance to compare directly the two different modern interpretations of a set of medieval terms. Since the terminology employed by Peter Tudebode is almost identical to that of the *Gesta Francorum*, both in the individual terms used and in

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[33] PT, p. 92; GF, p. 404.
[34] PT, p. 22; GF, p. 179.
[35] PT, p. 107; also see below, 'Siege of Jerusalem: Messenger/Spy Thrown toward City', pp. 185-189.

the context of those references, any differences in the translation of those terms will illustrate the confusion in the modern interpretations of these machines. Of the four occasions in which artillery is referenced by Peter Tudebode three come direct from the *Gesta Francorum*. The first of these, during the siege of Nicaea, sees the term *funda* translated rather directly and simply as 'sling'.[36] Such a sensible approach to the term *funda* is not consistent throughout the work, however. The one reference that is unique to Tudebode sees the phrase *posuerunt eum in funda cujusdam ingenii, quod petrera vocatur* translated as 'they placed him on the bottom of a machine called a petrary.'[37] The translation of *petrera* as 'petrary' is reasonable but rendering *funda* as a 'machine' seems unusual and unnecessary, especially considering that the editors had shown sufficient awareness to interpret *funda* more correctly as a 'sling' at an earlier juncture. The two other incidents involving artillery should be considered as straightforward, with *arbalistae* translated as 'arbalists' and *instrumenta* as 'machines' in the accounts of the sieges of Nicaea and Ma'arrat-an-Numan respectively.[38] These interpretations by John and Laurita Hill are very close to the translations of the same events in the *Gesta Francorum* by Rosalind Hill. The rendering of both *funda* as 'sling' and *arbalistae* as 'arbalists' are the same in both and the use of 'machines' to represent *instrumenta* is not appreciably or qualitatively different from Rosalind Hill's use of 'engine.'

ROBERT THE MONK, *HISTORIA IHEROSOLIMITANA*

Robert the Monk's *Historia Iherosolimitana* is available in a number of editions; the edition being used for this thesis is that in the *Recueil des Historiens des Croisades*.[39] Robert was a monk in an abbey in the episcopate of Rheims. It is possible, though not certain, that he was a member of the Benedictine abbey of St. Remi in Reims itself. Little is known about Robert as a man; it has, in places, been suggested that he was Abbot Robert of St.-Rémi but there is little evidence backing

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[36] PT, p. 23; PT, Hills, p. 31.
[37] PT, p. 107; PT, Hills, p. 117.
[38] PT, p. 23; PT, Hills, p. 33. PT, p. 92; PT, Hills, p. 99.
[39] Robert the Monk, *Historia Iherosolimitana*, RHC, Occ 3, pp. 719-882 (hereafter RM).

this possibility and one cannot presume its accuracy.[40] What is known about Robert comes from his own writing in the *Historia Iherosolimitana*. The author was a monk who stated that he was at the 1095 Council of Clermont, which saw Pope Urban II call the First Crusade, but Robert was not present on the march of the First Crusade.[41] Thus, it must be recognised that there was a significant distance between the author and the events he described. The work was written in the period following Bohemond's tour of Europe, probably by about 1106.[42] It is one of a number of western European accounts of the First Crusade that sought to improve and build upon the *Gesta Francorum*, which was viewed with an element of distain due to its rudimentary Latin prose.[43] As such, this account of the First Crusade owes much to the *Gesta Francorum* for its information and structure.[44]

The breadth of terms available to Robert the Monk to describe military machinery is well illustrated by his description of what the crusaders constructed at the outset of the siege of Antioch. Robert recorded that the crusading forces built *machinamenta bellica*, the exact nature of which he then expanded on: *turres ligneae, balistae, falces, arietes, sues, talpae, tela, sudes, et fundae.*[45] For some of the machines Robert included in that list there is no other evidence that they were built or used in the course of the siege.[46] Consequently, this section can be viewed as a rhetorical device on Robert's part to show the lengths the crusaders went to in this siege to ensure they left no element of poliorcetics untried in their efforts to capture Antioch. This section of his work also shows the extensive nature of

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[40] RM, Sweetman, pp. 3-4; C. Kostick, *The Social Structure of the First Crusade*, p. 66.

[41] RM, p. 721.

[42] The probable quotation of Robert's work in the Magdeburg charter of 1107/08 points to this approximate date. G. Constable, 'The Place of the Magdeburg Charter of 1107/8 in the History of Eastern Germany and the Crusades,' in F. J. Felten and N. Jaspert, eds., *Vita Religiosa im Mittelalter. Festschrift für Kaspar Elm zum 70 Geburstag*, (Berlin, 1999), pp. 283-300; RM, Sweetman, p. 7; C. Kostick, *The Social Structure of the First Crusade*, pp. 66-7.

[43] RM, p. 721. Also Baldric of Dol, for example, referred to the *rusticanus stilus* of the *Gesta Francorum* – BD, p. 10.

[44] *Histoire Anonyme de la Première Croisade*, L. Bréhier, ed. (Paris, 1924), p. viii; RM, pp. 15-17.

[45] *Ibid.*, p. 775; also see below, 'Siege of Antioch: Building of Equipment by the Crusaders', pp. 134-137.

[46] See below, 'Siege of Antioch: Building of Equipment by Crusaders', pp. 134-137.

Robert's military vocabulary. He had recourse to terms to describe a plethora of siege machinery. In doing so he portrays a strong knowledge of military terminology at least, if not of the military function of the machines that he listed. The manner in which he refers to both *sues* and *talpae* may suggest that he was not aware of the specifics of those machines. Though it is difficult to be certain, there would seem to be little to differentiate between these two contraptions, both of which may have been shelters to allow for the soldiers to approach the walls. If this is a duplication, Robert could be said to have been merely listing the machines of which he knew the titles, rather than exhibiting a strong direct knowledge of military matters.

Dealing specifically with artillery, the *Historia Iherosolimitana* has a limited but fascinating nomenclature: over the course of six incidents throughout the work there are seven uses of artillery terminology. These references are made up of four uses of the term *balista*, two references to *tormenta* and one to the presence of *fundae*.[47] There is also one use of a general term, *instrumentum*, in a clear artillery sense. Robert does not let that term stand alone, however, instead clarifying it by referring to *instrumentum, quo grandes lapides adversum turrim jaciebant*.[48] The aberrant reference to *fundae* occurs in the course of the siege of Nicaea alongside a mention of *balistae* engaged in the same action, the throwing of heads over the walls of the city.[49] The use of *fundae* to describe artillery pieces at this particular point of the narrative seems to be a direct borrowing from the *Gesta Francorum* which also described the incident. Despite Robert's clearly more elaborate language, the section in question in his *Historia* shares several terms with the description of the same incident in the *Gesta Francorum*. This in the only example in the entirety of the Robert's *Historia* that he employs a term for artillery that was used in the same context in the *Gesta Francorum*. In every other occasion, Robert the Monk's artillery nomenclature has a distinct independence from that of the *Gesta*.

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[47] RM, p. 756 – *balistis*; *Ibid.*, p. 757 – *balistis et fundis*; *Ibid.*, p. 775 – balistae; *Ibid.*, p. 777 – *balistis*; *Ibid.*, p. 853 – *tormentum*; *Ibid.*, p. 857 – *tormento*.
[48] *Ibid.*, p. 846.
[49] See below, 'Siege of Nicaea: Heads Thrown into the City', pp. 119-124.

Relative to First Crusade narrative works such as the *Gesta Francorum*, Raymond d'Aguilers' *Historia Francorum* and Albert of Aachen's *Historia Ierosolimitana*, there has been little published on the nature of Robert the Monk's account of the First Crusade. For a number of reasons, including the obscurity of the author, this work remains enigmatic. Despite this, there are elements of the military sections of the work that shed light on the veracity of Robert's account as well hinting at the source of some of his points of information. This includes two of the incidents mentioned above in which Robert referred to the use of artillery to throw heads into a besieged city for the purposes of psychological warfare at the sieges of Nicaea and Antioch. Robert wrote that, at Nicaea, *balistis et fundis occisorum capita Turcorum intus projicibant*; at Antioch the account states that *balistis incisa capita in civitate projecerunt.*[50] There is an obvious similarity in the terminology applied to the machines used to propel heads into the two cities: *balistiae* and *fundae* at Nicaea and *balistae* at Antioch. There is a difference, however, in the sources of the information for these incidents. The throwing of heads at Nicaea is also reported in the *Gesta Francorum* and, as has been noted, there are definite similarities in the language employed by Robert to that of the *Gesta Francorum* for the same incident. There is no question in the case of Nicaea about the main source of Robert the Monk's information for the incident as a whole, only about his reasons for the inclusion of the term *balistae* alongside the machines described in the *Gesta Francorum*. It is debatable whether this was merely an aspect of Robert the Monk's classicising tendencies or if he had another source for this incident that informed him of the presence of *balistae* alongside the *fundae* described by the Anonymous. The incident of throwing heads recorded by Robert the Monk at Antioch is different in an important respect: the *Gesta Francorum* did not record it. Given its absence from Robert the Monk's master source, it would be remiss to leave the veracity of the incident unquestioned. There is, however, no reason to doubt that the crusaders threw severed heads over the walls of Antioch since Albert of Aachen, a source entirely independent of the *Gesta* tradition, also recorded the

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[50] RM, p. 757; also see below, 'Siege of Nicaea: Heads Thrown into the City,' pp. 119-124. RM, p. 777; also see below, 'Siege of Antioch: Turkish heads thrown over the walls,' pp. 144-145.

incident at Antioch as well as the earlier one at Nicaea.[51] Thus, it is apparent that on this occasion at least, Robert the Monk had an alternative source of information to the *Gesta* that was reliable about artillery use.

In Robert's work, as has been pointed out, there were several references to *balistae*, two at Nicaea and a further two at Antioch. It could be argued from these references that the best explanation for his nomenclature was that his use of the term *balista* was merely the term to which he was most partial. A parallel to this possible explanation would be the manner of Albert of Aachen's consistent use of the term *mangena*.[52] Doubt is cast on this explanation, however, when one compares Robert's use of *balista* with the application of that term by other sources. There is a clear pattern evident in the use of that term in some First Crusade sources and Robert the Monk's account is one of those which, alongside the works of Albert of Aachen and Ralph of Caen, employs the term *balista* prominently at the sieges of Nicaea and Antioch but almost never at the later sieges of the First Crusade. It is the works of Robert and Albert of Aachen that provide the most striking examples of this change. At the sieges of Nicaea and Antioch references to *balistae* dominate references to artillery pieces whereas afterwards they only appear in two somewhat isolated references in the accounts of the siege of Jerusalem written by Ralph of Caen and Guibert of Nogent.[53] Consequently, rather than supposing that *balistae* was merely Robert's favoured, generic term to denote artillery, the nomenclature of the *Historia Iherosolimitana* must be viewed in the light of that of Albert of Aachen, Raymond d'Aguilers and the *Gesta Francorum*. In their works *balistae* is consistently used in a clearly artillery related context but only for a limited period, predominately toward the start of the crusade and centred on the sieges of Nicaea and Antioch. The term must be ascribed more significance than is merited by a generic artillery term.

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[51] AA, pp. 236-8; also see below, 'Siege of Antioch: Turkish Heads Thrown over the Walls', pp. 144-145.
[52] See below, 'Albert of Aachen', pp. 59-65.
[53] RC, p. 693; also see below, 'Siege of Jerusalem: Artillery Involvement in Siege-tower attack', pp. 194-209. GN, p. 311; also see below, 'Siege of Jerusalem: The *Tafurs*', pp. 212-213.

There are problems whenever *balista* is used in medieval chronicles, as there is a possible confusion over the best interpretation of the term: should it be rendered as a crossbow or as an artillery piece? Furthermore, if it is interpreted as an artillery piece, can the term be used as evidence of the presence of a piece with the morphology of the *balista* of late Antiquity or is that too concrete a conclusion to draw from one term? It is clear from many of the appearances of the term in Robert the Monk's work that he definitely intended the term *balistae* to indicate artillery.[54] Thus the issue at hand is whether or not the appearance of this term in the context of artillery can be used as an indication of the actual presence of artillery in the form of *balistae* in the late classical sense of the term. The one classical military treatise that survived in use into the Middle Ages was that of Flavius Vegetius Renatus, *Epitoma rei militaris*.[55] This work dating from late Antiquity – sometime in the late fourth or first half of the fifth centuries – was a very popular work in the eleventh and twelfth century and survives in the form of fifty-four manuscripts written before 1300.[56] It has been shown to have been used by, among others, the Angevins from as early as the time of Fulk III Nerra in the late tenth century and the literary circles of the mid-twelfth century Angevin court.[57] Furthermore it was known to authors such as Bede, Alcuin and Rabanus Maurus, all of whom wrote before the advent of the crusading movement.[58] The extent of the availability of Vegetius' treatise

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[54] This can be seen at Nicaea and Antioch where *balistae* were described as being employed to throw heads, a feat surely beyond the capability of a hand held crossbow: RM, p. 757, see below, 'Siege of Nicaea: Heads Thrown into the City', pp. 119-124; RM, p. 777, see below, 'Siege of Antioch: Turkish Heads Thrown over the Walls', pp. 144-145. There are also two occasions on which Robert the Monk included *balistae* in lists of large machines that were constructed at the outset of sieges. The inclusion of *balistae* alongside, for example, battering rams and siege-towers, shows that Robert considered these weapons as large artillery pieces: RM, p. 756, see below, 'Siege of Nicaea: Construction of Equipment by the Crusaders on Ascension Day', pp. 108-110; RM, p. 775, see below, 'Siege of Antioch: Building of Equipment by the Crusaders', pp. 134-137.

[55] Vegetius, *Epitoma rei militaris*, M. D. Reeve, ed., (Oxford, 2004). The *Epitoma rei militaris* is also known as *De rei miliatrii* amongst other variations on those titles.

[56] For discussion of the date of the *Epitome rei militaris* see: M. B. Charles, *Vegetius in context: establishing the date of the Epitoma rei militaris* (Stuttgart, 2007). C. Shrader, 'The Influence of Vegetius' *De re militari*', *Military Affairs*, 45/4. (Dec., 1981), 171, n. 10.

[57] *Ibid.*, p. 169; B. Bachrach, 'The practical use of Vegetius's *De re militari* during the Early Middle Ages,' *The Historian*, 47 (1985), p. 244.

[58] C. Shrader, 'The Influence of Vegetius,' *De re militari*', p. 172, n. 11.

throughout medieval Europe makes it possible, and perhaps even probable, that the explicit descriptions of artillery in the work were known and understood both by the military leaders and some of the authors of the period and the crusade. As a result, there can certainly be a case made for interpreting the term *balistae* as meaning an artillery piece in the late classical sense of the word when the ancillary evidence fits with such a definition.

With the preponderance of references to *balistae* in Robert the Monk's work (the term appears in four of six incidents involving possible artillery pieces) the crossbow-or-artillery problem associated with the term is particularly acute in this work. The problem of interpretaton would be lessened if there was another term in the work that could be seen to be referring to crossbows but no such term is apparent in the work. If Robert was using *balistae* to refer to artillery pieces, it is possible that it included crossbows under the general heading *arcus* and that he did not differentiate between crossbows and curved bows.

In the section of his work following the period that culminated with the 1098 fall of Antioch, where *balistae* is the dominant term for artillery, a new term that emerges in Robert's work is *tormentum*. For this later period of the crusade Robert the Monk only recorded artillery use at the siege of 'Arqah (1099). The term *tormenta* in the case of 'Arqah is used to describe two distinct sets of machines, one each used by the attackers and the defenders. Firstly, Robert the Monk used the term in connection with the crusaders' unsuccessful attack on the city *omni genere telorum et tormentorum*.[59] Subsequently, the term was employed in Robert's description of the death of *Pontius Balonensis, cujus tempora perforavit ictus lapidis tormento jaculati*.[60] This incident connects the term with the throwing of stones and clearly marks it out as an artillery piece. There is, however, nothing inherent in the actions of the *tormenta* in these two incidents that immediately explains Robert the Monk's choice of a different term to describe the machines in question. It is, however, worth recognising that both the *balistae* and *tormenta* are terms with classical connotations. Their appearance as the dominant terms in Robert the Monk's work could, perhaps, be explained by his desire to improve upon the

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[59] RM, p. 853.
[60] *Ibid.*, p. 857.

style and language of the *Gesta Francorum*, in the case of artillery terminology, by the application of classical terminology to the crusader machines. Given this possibility, solid conclusions are not likely to emerge from this overview of the author's terminology. Rather it is case studies, which will consider all the evidence from all the authors on each incident of artillery use in the First Crusade, that are likely to provide more concrete deductions.[61]

The most readily available English version of Robert the Monk's narrative is that of Carol Sweetman. Sweetman provides largely consistent translations of the terms employed by Robert the Monk. For the most part *balistae* is rendered as 'catapult' – a non-specific term that avoids coming to any conclusion on the morphology of the machines involved.[62] On one of these occasions the phrase *balistae et fundae* is translated as 'throwing machines and catapults' but, even though the order is reversed, we can assume, given the pattern visible elsewhere in the translation of terms, that *balistae* is being rendered as 'catapults' and *fundae* as 'throwing machines.'[63] The term 'catapult' was possibly chosen by the translator as a term to avoid having to contend with the contentious issue of the possible existence of classical-type *balistae* in the Middle Ages; if this is the case, it performs its task admirably. Some confusion is added to the otherwise orderly picture, however, by the translation of *tormentum*. *Tormentum* is at one point given in English as 'throwing machine' and at another point as 'catapult.'[64] This type of inconsistent translation, visible in the translations of other works also, indicates how modern editors of crusade texts, understandably, do not place the correct and exact rendering of artillery terminology high on their lists of priorities.[65] The translation of both *tormenta* and *balistae* as 'catapults' at different junctures of the edition is, however, misleading for those who are not engaging with the Latin text.

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[61] See below, 'Section 2: Case Studies', pp. 106-315.

[62] RM, p. 756; RM, Sweetman, p. 104. RM, p. 757; RM, Sweetman, p. 105. RM, p. 775; RM, Sweetman, p. 121. RM, p. 777; RM, Sweetman, p. 123.

[63] RM, p. 757; RM, Sweetman, p. 105.

[64] RM, p. 853; RM, Sweetman, p. 189. RM, p. 857; RM, Sweetman, p. 192.

[65] The translations of the other major works are treated at the end of each of their respective sections: *Gesta Francorum*, pp. 20; Peter Tudebode, pp. 23-24; Guibert of Nogent, pp. 46; Raymond d'Aguilers, pp. 49-50; Fulcher of Chartres, pp. 56-57; Albert of Aachen, pp. 69-70; Ralph of Caen, pp. 73-74; The 'Lisbon Letter', pp. 79; *De Expugnatione Lyxbonensi*, p. 81; William of Tyre, pp. 92.

Compared with the more limited biographical information available for the other First Crusade authors, a significant amount is known about Baldric of Dol. A poet as well as a First Crusade narrator, abbot of Bourgueil from 1079 to 1106, he later held the position of archbishop of Dol from 1107 until his death in 1130.[66] There is evidence in the letters with which his *Historiae Hierosolymitanae* begins to suggest that Baldric wrote it soon after becoming archbishop of Dol in 1107.[67] The work is dedicated to Abbot Peter of Maillezais and Peter, replying to that dedication, congratulated Baldric on becoming archbishop of Dol, an act that would seem out of place if Baldric had already held that position for any significant length of time, thus suggesting a date of composition soon after Baldric's accession to that office.[68] Baldric was an accomplished man who held an important ecclesiastic position at the time he wrote his account of the First Crusade. His poetry is better known and studied than his narrative of the First Crusade.[69] This poetic nature is evident in the stylised character of his narrative, especially in his imitation of classical poets.

Baldric of Dol's text is the least accessible of the writings of the early authors of the First Crusade. His work, the *Historiae Hierosolymitanae*, does not exist in an edition more recent that the late nineteenth century. This latest version of the text is that in the *Recueil des Historiens des Croisades* and this is the edition used for the purposes of this thesis.[70] The *editio princeps* was edited by Jacques Bongars.[71]

The *Historiae Hierosolymitanae* is, like the works of Peter Tudebode, Robert the Monk and Guibert of Nogent, heavily reliant on the *Gesta Francorum*

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[66] C. Kostick, *The Social Structure of the First Crusade*, p. 52
[67] BD, pp. vi, 5, 8; C. Kostick, *The Social Structure of the First Crusade*, p. 52
[68] BD, pp. 5, 7.
[69] F. J. E. Raby, *A History of Secular Latin Poetry in the Middle Ages*, 2 (Oxford, 1997), I, 337-8.
[70] Baldric of Dol, *Historiae Hierosolymitanae*, RHC, Occ 4, pp. 1-263.
[71] *Gesta Dei per Francos, sive, Orientalium expeditionum et regni Francorum Hierosolomitani historia*, J. Bongars, ed., (Hanover, 1611) .

for its structure and information. In the prologue to the *Historia*, however, Baldric was critical of the *Gesta* and its style:

> sed nescio quis compilator, nomine suppresso, libellum super hac re nimis rusticanum ediderat; veritatem tamen texuerat, sed propter inurbanitatem codicis, nobilis materia viluerat; et simpliciores etiam inculta et incompta lectio confestim a se avocabat.[72]

An explanation of Baldric writing an account of the First Crusade is evident in this quotation: the unacceptable standard of the *Gesta's* style necessitated the reworking of the account with an appropriate sophistication. The application of more polish to the narrative is apparent in the amount of classical allusions and references in the work. A strongly classicising text, the *Historiae Hierosolymitanae* contains numerous terms and phrases that appear archaic in the context of late eleventh century warfare. For example, the work includes three uses of the word *phalanges* or phalanxes, an uncommon term in the context of the narratives of the First Crusade and certainly one with classical connotations.[73] These classical influences on Baldric's work are germane to the issue of artillery as a result of the proportion of artillery references in the work that involve the use of the term *balista*, as will be discussed below.

Artillery references in Baldric's work are marginally more profuse than they are in his source material, the *Gesta Francorum*.[74] Whereas the *Gesta* contained only two or three uses of terms that specifically depicted artillery, Baldric of Dol's *Historiae Hierosolymitanae* contains five uses of such specific terms over the course of four incidents.[75]

The reliance of Baldric of Dol on the *Gesta Francorum* is evident in the manner in which, even though the wording of the *Gesta* may have been altered, Baldric retained the essence of the source material's artillery references in the *Historia*. At the siege of Nicaea, when the crusaders were reported to have thrown

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[72] BD, p. 10.

[73] BD, pp. 39, 56, 85.

[74] For a discussion of the artillery language of the *Gesta Francorum* see above, pp. 19.

[75] BD, p. 27 – *fundibularii*; *Ibid.*, p. 27 – *balistis et arcubus et fundis*; *Ibid.*, p. 54 – *balistae*; *Ibid.*, p. 85 – *balistarii*.

the heads of slain Turks into the city, though altering the wording of the *Gesta*, Baldric quite clearly maintained the crucial elements in reference to artillery:

Gesta Francorum, p. 182:	**Baldric of Dol, p. 27:**
Proiiciebant autem nostri capita occisorum *funda* in urbem, ut inde Turci magis terrerentur.	multis autem internecioni deditis victoriosi redierunt, attulerunt etiam plurima caesorum capita, quae *fundibularii* projecerunt in civitatem, ad obsidentium exsultationem, ad obsessorum perturbationem.

The identification of the machine in question as *funda* is maintained by Baldric. Though the wording changes in Baldric's rewriting, there is little alteration in the sense of the passage.

The second incident in which the use of artillery was described in the *Gesta Francorum* involved the provision of protection for men attempting to undermine the walls of Nicaea:

Gesta Francorum, p. 183:	**Baldric of Dol, p. 27:**
Denique comes Sancti Egidii et episcopus Podiensis consiliati sunt in unum, qualiter facerent suffodi quamdam turrim, quae erat ante tentoria eorum. Ordinati sunt homines qui hanc suffodiant, et *arbalistae et sagittarii*, qui eos undique defendant.	Aggressi itaque civitatem, colonos rebellantes, *balistis* et arcubus et *fundis* deterrentes (grandinem etenim supervenientia tela putares), homines praeparatos ad muros usque direxerunt, et ne quid eis mali possent oppidani moliri, sagaciter eos tuebantur; suffoderunt itaque turrem radicitus, immissisque lignis, et igni in muro terebrato succenso, indemnes redierunt ad suos.

In this comparison between the text of the *Gesta Francorum* and the *Historiae Hierosolymitanae*, the changes wrought by Baldric to the language of his source material are undoubtedly more marked than in the previous example. Among the abundant changes made by Baldric to the text of the *Gesta* is the alteration in the description of the machines used from *arbalistae et sagittarii* to *balistae et arcus et fundae*. There is a number of points to note regarding these changes. Firstly, the alteration of the term *arbalistae* to *balistae* indicates that the two may have been coterminous. The nature of the term *arbalistae* is debatable but, given that elsewhere in his account, Baldric definitely used *balista* to indicate the presence of

artillery, this re-interpretation of the *Gesta's* language by Baldric indicates that *arbalistae* was, perhaps, an artillery term.[76] The second important change made by Baldric to this section of the *Gesta* is the addition of *fundae* to the list of machines used. Though Baldric is the only source to refer to *fundae* in this incident, there are other references to the use of *fundae* in the course of the siege of Nicaea. There is, therefore, a possibility that Baldric had particular reason to mention *fundae* in this case and was correct in doing so.

The third and final artillery reference in the *Gesta Francorum* centred on the application of artillery by the defenders of Ma'arrat-an-Numan in an attempt to hinder the progress of a crusader siege-tower.

Gesta Francorum p. 404:	Baldric of Dol, pp. 84-5:
fecit Raimundus comes de Sancto Egidio fieri quoddam ligneum castrum forte et altum. Quod castrum ingeniatum et aedificatum erat super IV rotas, super quod stabant plures milites et Evrardus venator, tubam fortiter sonans; subter vero erant armati milites, qui deduxerunt castrum usque prope urbis murum iuxta turrim quamdam. Quod videns gens pagana, statim fecerunt *instrumentum* quo iactabant maximos lapides super castrum, ita ut paene nostros milites occiderent. Iaciebant quoque grecos ignes super castrum, putantes illud ardere et devastari. Sed Deus omnipotens noluit ut castrum arderet hac vice; Supereminebat uero omnes muros ciuitatis.	Raimundus enim comes ligneam compaginari machinam fecit, quae, ut habilior esset ad conducendum, super quatuor eam collocaverat rotulas; fuit autem tantae proceritatis, ut moeniorum culmen despiceret, turrium quoque porrecturam adaequaret. Admoverunt igitur struem illam propter quamdam turrem. Lituorum et tubarum clangebant classica; phalanges armatae circumvallabant moenia, *balistarii* et sagittarii spicula dirigebant, et qui in arce lignea erant, lapides immensos sursum jactitabant; sacerdotes et clerici Deum suppliciter exorabant quatenus suam defenderet Christianitatem, praestans illis sospitatem et victoriam. Wilhelmus de Monte Pislerio erat in machina, et alii multi. Et quoniam aedificium illud erat muris porrectius, facilius eis nocebant, utpote super quos lapides jaculati desursum ruebant. Percussi vero vel in ancilibus vel in galeis vel in capitibus, indifficulter oppetebant et omnimodis deficiebant. Habebant etiam uncinos ferreos, quibus sine intermissione infestabant alii alios. Turci nihilominus qui erant in turribus, Christianos sagittis et lapidibus

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[76] *Ibid.*, p. 54; also see below, 'Siege of Antioch: Bohemond's Speech', pp. 152-153.

> impugnare; ignem, quem Graecum vocant, in machinam jacere, et nihil otiosum admittere.

The changes made to the older work are again striking. First of all, it can be seen that the *Gesta's* reference to an *instrumentum* is not replicated in Baldric's work even though he does refer to the throwing of stones by the defenders. Baldric's work is more ambiguous on this point; whereas in the *Gesta* it is clearly stated that an *instrumentum* threw the stones, Baldric's account makes it appear that stones might have been thrown by machine, by hand or, possibly, by both. There is another important difference between these two accounts: the mention by Baldric of the use of *balistarii* by the attacking crusaders.

As can be seen from this reference to the involvement of *balista*-men by the crusaders at Ma'arrat-an-Numan, it is evident that not all Baldric's references to artillery can trace their origin to the *Gesta Francorum*. In addition to the repeated *Gesta* references there is only one other clear use of an artillery term in Baldric's *Historia*. This occurs during Baldric's description of the siege of Antioch where the use of *balistae* is discussed.[77] Alongside this reference, which is entirely independent of the *Gesta Francorum*, there are two other references that are unique to Baldric: these arise as part of the alterations Baldric made to pre-existing artillery incidents from the *Gesta*. As such, two artillery references in Baldric's work that are independent of the *Gesta Francorum* involve the term *balistae* and a third involved the addition of *fundae*.[78] An argument could be made that the choice of *balistae* as the term used in two of Baldric's three independent artillery references should be seen as a manifestation of Baldric's classicising tendency. This cannot be said to be an argument without merit but it must also be recognised that the pattern of artillery references in Baldric's work fits in well with that visible in other First Crusade narratives. This applies to the use of the term *balistae* early in the course of the crusade but not in the later stages.

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[77] BD, p. 54; also see below, 'Siege of Antioch: Bohemond's Speech', pp. 152-153.
[78] BD, pp. 27 55, 85.

Guibert of Nogent's *Dei Gesta per Francos* was, like Robert the Monk's *Historia*, written in France in the period following Bohemond's visit to the region to drum up support for crusading.[79] The work was composed in the early years of the twelfth century, around 1106-1109 and most likely in the year 1109 itself.[80] Guibert was thus somewhat removed from the incidents that his work describes and, rather than being a first hand account, the *Dei Gesta* has a reliance on the *Gesta Francorum* for information about the events of the First Crusade though it does differ more from that work than some of the other reworkings of the *Gesta*.[81] The *Dei Gesta per Francos* is not the only extant work from the pen of Guibert; Guibert, a prolific author, wrote several theological works.[82] Perhaps more importantly for the purposes of this thesis, Guibert also wrote an autobiography, *De vita sua sive monodiarum suarum libri tres*.[83] As a result of this autobiography and other elements of his extensive writings, modern historiography is far better informed on the background to this author than it is for the majority of the other First Crusade authors. Guibert became the abbot of Nogent-sous-Coucy in 1104, a role he occupied until his death twenty years later. A well-educated Benedictine abbot,

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[79] L. Ní Chléirigh, 'Western perceptions of the Byzantine Empire in the aftermath of the First Crusade,' in C. Kostick, ed., *The Crusades and the Near East: Cultural Histories* (Abingdon, 2010). For Bohemond's tour of Europe see: J. G. Rowe, 'Paschal II, Bohemond of Antioch and the Byzantine Empire,' *Bulletin of the John Rylands Library* 49 (1966-7), pp. 156-202; R. B. Yewdale, *Bohemond I, prince of Antioch* (New York, 1924), pp. 106-14.

[80] GN, Levine, p. 1. R. B. C. Huygens, Introduction, *Dei Gesta per Francos*, *Corpus Christianorum, Continuatio Mediaevalis* 127A (Turnhout, 1996), pp. 51-6; C. Kostick, *The Social Structure of the First Crusade*, p. 75

[81] *Ibid.*, pp. 74-5.

[82] *Ibid.*, p. 74. Guibert's theological works include: *Quo ordine sermo fieri debeat*, R. B. C. Huygens, ed., *Corpus Christianorum, Series Latina*, 127, pp. 47-63; *Moralium Geneseos libri decem*, PL, 156 (1853), cols. 032-337; *Tropologiae in prophetas Osee, Amos ac Lamentationes Jeremiae*, PL, 156 (1853), cols. 337-488; *Tractus de Incarnatione contra Judaeos*, PL, cols. 489-528; *Epistoala de buccella Judae data et de veritate dominici Corporis*, R.B.C. Huygens, ed., *Corpus Christianorum, Series Latina*, 127, pp. 65-77; *De laude sancta Mariae liber*, PL, 156 (1853), cols. 537-578; *De virginitate opusculum*, PL, cols. 579-608; *De pignoribus sanctorum libri quatuor*, R. B. C. Huygens, ed., *Corpus Christianorum, Series Latina*, 127, pp. 175.

[83] Guibert of Nogent, *Autobiographie*, E.-R. Labande (Paris, 1981). For a translation see J. Benton, ed., *Self and Society in Medieval France: The Memoirs of Abbot Guibert of Nogent (1064-c.1125)* (New York, 1970).

Guibert presented his account of the First Crusade in a fashion that is replete with classical quotations and allusions. An important part of his work is Guibert's much higher level of interest in theological thought than the other chroniclers of the First Crusade.[84] Thus the *Dei Gesta per Francos* was not written with military affairs or the minute aspects of artillery operations at the forefront of the author's mind. The *Dei Gesta per Francos* is available in a number of editions, of which the most recent is that of R.B.C Huygens (1996).[85] An English version, translated by Robert Levine, is available and readily accessible.[86]

Guibert's approach to writing his *Dei Gesta per Francos* involved the use of notably complex language. His views on his major source work, the *Gesta Francorum*, are set out early on in his work when he wrote:

> Erat siquidem eadem Historia, sed verbis contexta plus equo simplicibus et quae multotiens grammaticae naturas excederet lectoremque vapidi insipiditate sermonis sepius exanimare valeret.[87]

To rectify these problems with the 'simple' work of the Anonymous, Guibert set out to construct a narrative with a consciously more complex language and vocabulary. His intention to avoid as 'insipid' and 'vapid' a style as that of the *Gesta* in his own writing is stated quite directly in the *Dei Gesta*:

> Opusculi huius mei, preter spiritualem, si qui stamen futurus est, fructum, ea intentio est, ita me velle dicere, uti ab alio, si eadem scriberet, michi referri voluerim. Talis namque animo meo voluntas adiacet, ut sit magis subobscurorum appetens, rudium vero et impolite dictorum fugitans. Ea quippe, quae meum exercere queant animum, pluris apprecior quam ea, quae captu facilia nichil memorabile avido semper novitatis largiuntur ungenio. Ego, plane, cum plura scripserim ac scriptitem, ita omnes extrusi ab animo, ut michi soli profutura putem, nulli alii placitura curem.[88]

Together with the complex theology Guibert of Nogent introduces to the crusade narratives, this drive for stylistic excellence encapsulates the essence of Guibert's

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[84] C. Kostick, *The Social Structure of the First Crusade*, p. 75

[85] GN. It is also available as part of the *Recueil des Historiens des Croisades*, published in 1866 (RHC, Occ 4, 113-263) and there are two seventeenth century editions (J. Bongars, *Gesta Dei per Francos* (Hanover, 1611); Dom. L. D'Achery, *Venerabilis Guiberti abbatis B. Mariae de Novigento opera omninia* (Paris, 1651)) as well as a version in *Patrologia Latina*, 156 (Paris, 1853).

[86] Guibert of Nogent, *The Deeds of God through the Franks, Gesta Dei per Francos* Robert Levine, ed., (Woodbridge, 1997)

[87] GN, p. 79.

[88] *Ibid.*, p. 200.

First Crusade narrative. The nature of the work is such that the study of his artillery terminology and, indeed, the study of any element of Guibert's work that involves the analysis of his vocabulary and turn of phrase cannot ignore his highly spohisticated approach. The work is so stylised that it must be questioned whether any of the appearances of artillery references in the course of Guibert's writing can be taken as correct depictions of the machinery present at the siege being described. Guibert was not an eyewitness to the events of the crusade and, as has been noted, was heavily reliant on the *Gesta Francorum* for his information.

The artillery references of the *Dei Gesta* are notably more numerous than those in Guibert's source work, the *Gesta Francorum*. Whereas the anonymous *Gesta Francorum* provides only three such references, the nature of one of which is debatable, over the course of eleven incidents in Guibert's work, there is a total of sixteen uses of terms to indicate the presence of artillery.[89] All three of the pertinent references in the *Gesta Francorum* reappear in Guibert's *Dei Gesta*. These references do not survive intact, however, and there are questions to be asked both about Guibert's alterations to the artillery references found in the *Gesta Francorum* and the source of the information on which he based his numerous additional artillery references. Guibert stated directly that any information that he added to that found in the *Gesta Francorum* came from eyewitnesses to the events described:

> Quae autem addiderim, aut ab his qui videre didicerim aut per me ipsum agnoverim. Quod si quippiam aliter dictum quam se res habet constiterit, incassum, fateor, mendacii michi probra callidus deprehensor obiecerit, cum me fallendi desiderio nulla dixisse sub dei testimonio scire possit. Quid enim mirum si fallimur dum aliena facta referimus, cum nos ne nostra ipsorum quidem cogitationes tacita saltem mente possimus? Quid de intentionibus loquar, quae adeo latere plerumque probantur, ut vix ab ipso interioris hominis acumine discernantur? Non est igitur severius arguendum si ignoranter in verba

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[89] GF, p. 182 – *funda*; *Ibid.*, p. 183 – *arbalistae*; *Ibid.*, p. 404 – *instrumentum quo iactant lapides*. *Ibid.*, p. 145 – *balistis*; *Ibid.*, p. 146 – *balistis ac fundis*; *Ibid.*, p. 146 – *arcibalistis et arcubus et balearis habenae*; *Ibid.*, p. 153 – *machinarum balistarumque*; *Ibid.*, p. 252 – *baleare ... instrumentum, quo iactis ingentibus saxis*; *Ibid.*, p. 264 – the same machine is referred to by both the terms *instrumenta* and *balistarum*; *Ibid.*, p. 264 – *machina*; *Ibid.*, p. 275– *balistarum*; *Ibid.*, p. 311 – *balistis et machinas*; *Ibid.*, p. 334 – *baleari instrumenta*; *Ibid.*, p. 346 – in the course of the siege the terms *balista* and *tormenta lapidibus* are used in a manner that suggests they may be referring to the same set of machines.

prolabimur, sed illud est irremissibili censura terendum, cum falsitas ex industria deceptionis vel cuiuspiam subornationis voto contexitur.[90]

That this statement is quickly followed by a number of sentences pre-emptively absolving Guibert of blame should there be any factual errors in the narrative which does not immediately convey a sense of confidence on Guibert's part in the veracity of his work.

It is to Guibert's reworking of the *Gesta Francorum* references that this discussion will turn first.

Gesta Francorum, p. 182:	Guibert of Nogent, p. 146:
Proiiciebant autem nostri capita occisorum *funda* in urbem, ut inde Turci magis terrerentur.	Qui a nostris gratanter, ut decebat, excepti, cesa sua capita pro testimonio nostrorum victoriae reliquerunt, quae post eorum fugam *balistis ac fundis* ad terrorem gentilium proiciebantur in urbem.

Though this is the first appearance of artillery in the *Gesta Francorum*, occurring early in the course of the account of the siege of Nicaea, it is the second such appearance in the *Dei Gesta*. Not only is the context of the reference altered and embroidered but the terminology used to depict artillery in this instance can also be seen to have been modified. Rather than merely maintain the *Gesta Francorum's* mention of the use of *funda* at this juncture, Guibert of Nogent refers to *fundae* and adds in a reference to *balistae*. The change in terminology evident here is not unique to Guibert, however, as Robert the Monk made a similar terminological change, editing the *Gesta Francorum's funda* to *balistae et fundae*.[91] That there is a similar change evident in the work of Robert the Monk lends credence to the possibility that there was a well founded reason to change the terminology found in the *Gesta Francorum*. Certainly, in Robert the Monk's work, there is a suggestion that he had some form of evidence that indicated that *balistae* had been in use in the course of the First Crusade to propel heads from at besieged cities as he included another such incident, independent of the *Gesta Francorum*,

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[90] *Ibid.*, p. 82.
[91] RM, p. 757.

during his account the siege of Antioch.[92] This incident alone does not prove how reliable or inaccurate Guibert's artillery embellishments were.

Gesta Francorum, p. 183:	Guibert of Nogent, p. 146:
Denique comes sancti Egidii et episcopus Podiensis consiliati sunt in unum qualiter facerent subfodi quamdam turrim, quae erat ante tentoria eorum. Ordinati sunt homines qui hanc suffodiant, et *arbalistae* et sagittarii, qui eos undique defendant	At beatae memoriae Podiensis episcopus et Sancti Egidii comes Raimundus, infirmando urbis statui insistentes, turrim quondam, quae erat ipsorum contigua castris, factis subter ad eius fundamenta enervanda cuniculis destituere agressi sunt. Fossoribus igitur ad haec efficienda locates, cum *arcibalistis* et arcubus et *balearis habenae tortoribus* pariter suffodientium defensores adduntur

The discussion of the protection provided by the crusading forces to their fellow warriors who were engaged in the undermining of Nicaea's defences also displays Guibert's tendency to embellish and employ ornate language in his account. There are two clear differences evident here in artillery terminology: firstly, the spelling of the *Gesta Francorum's arbalistae* is changed to *arcibalista* in the *Dei Gesta* and, secondly, Guibert adds a third type of missile weapon operator into the list, *balearis habenae tortoribus*. Furthermore, the *sagitarii* of the *Gesta* become *arcubus*. The alteration of the term *arbalistae* to *arcibalista* does not seem to indicate any particular difference in meaning.[93] The specifics of this editing has no parallel or precedent in the other early First Crusade narratives and it is unclear where, if anywhere, Guibert obtained the information on which this alteration was based. In this instance, it would appear that, Guibert's claim to have spoken to eyewitnesses notwithstanding, there is a distinct possibility that Guibert's main aim in making these changes was to affect a more pleasing style of writing than that of the *Gesta Francorum*. Thus this instance, which contains both stylistic changes and the addition of information that is not present in the work of the Anonymous, exemplifies both of the major types of edits that Guibert made to his source

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[92] Though independent of the *Gesta Francorum*, Robert the Monk cannot be accused of having fabricated information here. The incident of heads being at Antioch is backed up Albert of Aachen whose account stands apart as one that was entirely free from the influence of the *Gesta* family of sources. AA, p. 236-8; also see below, 'Siege of Antioch: Turkish Heads Thrown over the Walls', pp. 144-145.

[93] J. F. Niermeyer & C. Van de Kieft, *Mediae Latinitatis Lexicon Minus*, I (Leiden, 2002) p. 77.

material. The introduction of the term *Balearis* is also interesting as it may suggest a classicising tendency. There is evidence in the detail of Guibert's description of the actions of the miners to suggest that his account of these events is not entirely reliable. It is the appearance of a *cuniculum* or tunnel that creates doubts about the veracity of the description. That particular approach to mining, using a tunnel under the walls in contrast to the simpler tactic of removing stones directly from the lower portions of the mural structure, is inconsistent with the information on this incident from other sources.[94] Furthermore, references to the use of *cuniculi* are rare in the crusader accounts. There is only one in Fulcher of Chartres' account of the crusade and the crusader states until 1127.[95] Similarly, Albert of Aachen, although he refers to mining on several occasions, makes no reference to the use of tunnels.[96] This does not rule out the use of tunnels but their use is not attested to by the major sources. Indeed some of the accounts of mining are such that they preclude the use of tunnels – such as Albert of Aachen's description of an unsophisticated attempt to break down a tower at Haifa in 1100 with axes and mattocks.[97] As such, it would appear that either Guibert of Nogent or his source of information for this incident is likely to have been incorrect in the assertion that the crusaders constructed a *cuniculum* in an attempt to undermine the walls of Nicaea.

As with any element of Guibert's writing, one cannot ignore the possibility that there was some classical influence at work that led to his use of the term *cuniculum* in this instance. A description of the use of a *cuniculum* in the process of undermining defences appears in Vegetius's *Epitoma* as well as the work of classical authorities such as Livy and Julius Caesar.[98] As such this incorrect addition by Guibert may be as a result of his knowledge of classical sources. Vegetius' discussion of how to use a *cuniculum* to undermine a wall occurs only

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[94] GF, p. 183; Rd'A, p. 21; BD, p. 27. Also see below, 'Siege of Nicaea: Missile Protection for Underminers', pp. 125-129.

[95] FC, p. 691: this was during an assault by a certain Belek against a fortress defended by King Baldwin II of Jerusalem. Belek was reported by Fulcher to have built a *cuniculum* which successfully led to the collapse of a mural tower.

[96] AA, pp. 384, 520, 644, 806, 812.

[97] AA, p. 520.

[98] Vegetius, pp. 140-1; Livy, *Ab Urbe Condita*, xxxi, 17; Julius Caesar, *De Bello Gallico*, 7, 22.

two passages after his description of *balistae*.[99] This proximity is mirrored in the manner in which this section in Guibert's work makes reference to *arcibalista* and a *cuniculum* in quick succession, it is not impossible that Guibert made use of Vegetius's *Epitoma* in writing this section. Given this probable flaw in Guibert's recounting of military methods and as there is little reason to think that Guibert ever had the minutiae of artillery use in the forefront of his mind while writing, one cannot rule out the possibility that the additions to the event provided by Guibert are unreliable. Also, again taking into account Guibert's apparent lack of detailed interest in artillery, it is certainly possible that he did not in his discussions with eyewitnesses make a special attempt to discover the exact nature of the machines used.

Gesta Francorum, p. 404:	Guibert of Nogent, p. 252:
Quod videns gens pagana, statim fecerunt *instrumentum* quo iactabant maximos lapides super castrum, ita ut paene nostros milites occiderent. Iaciebant quoque grecos ignes super castrum, putantes illud ardere et devastari.	Econtra urbani *baleare* celeriter edificant *instrumentum*, quo iactis ingentibus saxis nitebantur debilitare castellum, in tantum, ut frequens lapidum ictus et machinae dampnum et nostris minaretur interitum. Iniectis quoque grecis ignibus super phalam moliebantur incendium, sed eorum dues super isto fefellit adnisum.

This artillery reference, which in Guibert of Nogent's work corresponds with the final appearance of artillery in the *Gesta Francorum*, is such that one can, again, clearly observe Guibert's tendency to embellish his source material. Though the artillery elements of this quotation remain largely true to the original, the addition of the adjective *Balearis* – one that is arguably a characteristic of classically inclined authors who may have wanted to exhibit their scholarship – has no immediately identifiable source and might, perhaps, best be dismissed as a stylistic adjunct.[100]

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[99] The section describing *balistae* is 4:22 (Vegetius, pp. 138-9) whereas that describing undermining including the use of tunnels is only two passages later, 4:24 (Vegetius, pp. 140-1).

[100] For analysis of the use of the adjective Balearic by other crusade narratives see 'Albert of Aachen', below, pp. 67-69, 'Ralph of Caen', below, pp. 71-73 and '*De Expugnatione Lyxbonensi*', below, pp. 80-81.

Guibert of Nogent is among the group of First Crusade authors who makes significant use of the adjective *Balearis* in their accounts.[101] There are three separate occasions in the work where the term appears.[102] Given the use of the term by Vergil and other ancient writers, there is an argument to be made that the use of this phrase with artillery could be connected to the classical learning of certain authors and a desire to exhibit that learning.[103] On the other hand, the repetition of Vergil's information by the seventh-century encyclopedist, Isidore of Seville, also provides a likely source for the twelfth-century awareness of the term.[104] With this multitude of possible sources for *Balearis* as an adjective indicating the ballistic nature of weaponry, it would be awkward to claim that the appearance of the term should have any implications for our understanding of the typology or morphology of the weaponry in question. Rather it is best treated as an indication of the learning and reading of the authors who apply it.

The veracity of the remaining artillery references in Guibert's work, the most noteworthy of which are the six uses of the term *balistae*, must be questioned.[105] That this term, the most common of the words Guibert used for artillery, was one with a strong element of classical terminology associated with it and given the significant doubts that have been raised about the alterations Guibert made to the *Gesta Francorum*, it must again be suggested that the *Dei Gesta's* artillery references were too stylised to be entirely useful and that any conclusions on the nature of artillery in this period that rely in part on the terminology of Guibert of Nogent will always have questionable foundations.

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[101] See below, 'Albert of Aachen', pp. 67-69 and 'Ralph of Caen', pp. 71-73.

[102] GN, p. 146 – *arcibalistis et arcubus et balearis habenae*; *Ibid.*, p. 252 – *baleare ... instrumentum*; *Ibid.*, p. 334 – *baleari instrumenta*.

[103] Vergil, *Georgicon*, 1, line 309.

[104] Isidore of Seville, *Etymologiarium sive Originum*, W. M. Lindsay, ed., (Oxford, 1985), 14, vi, lines 47-51.

[105] GN, p. 145, also see below 'Siege of Nicaea: Construction of Equipment by the Crusaders on Ascension Day', pp. 108-110; GN, p. 146, also see below 'Siege of Nicaea: Heads Thrown into the City', pp. 119-124; GN, p. 264, also see below 'Siege of 'Arqah: Crusader Equipment', pp. 174-180; GN, p. 146, also see below 'Siege of 'Arqah: Defenders' Equipment', pp. 180-182; GN, p. 275, also see below 'Siege of Jerusalem: Building of Equipment by the Crusaders', pp. 184-185; GN, p. 311, also see below 'Siege of Jerusalem: The Tafurs', pp. 212-213.

One area in which the *Dei Gesta* is undeniably informative is in the details it provides about the nature of the men who operated artillery pieces in the course of the First Crusade. In his discussion of the aftermath of the siege of Nicaea, Guibert made reference to the betrayal of the rank and file crusaders by the Byzantine emperor, Alexius I. There was a perception that in accepting the surrender of the city and not allowing the plundering of Nicaea, Alexius had robbed a significant proportion of the crusaders of an opportunity for financial gain following their toil and struggle outside the walls of the city. The crusading princes did not feel victimised in this manner as Alexius showered them with gifts following the capture of the city. The poor were also given alms by the emperor meaning that it was just those financially in the middle that were left disgruntled. Guibert wrote about the role played by those aggrieved elements of the crusade forces in the course of the siege:

> Ex quo mediocribus exercitus personis, quas munificentia illa est visa pretergredi, multa fuit invidentia contra principes ac simultas ingentia. Nec iuxta quondam modum id prorsus iniuria! Hi nempe exercuere prelia, ad hos attinuit totius obsidionis effectus, molium vectiones, *machinarum balistarumque* impactio, hi, inquam ut brevier claudam, portavere pondus diei et estus.[106]

In this instance, Guibert provides information not readily available from other First Crusade sources. The clear message from this passage is that it was primarily these middle elements of the crusading forces that operated the artillery pieces. It is unclear whether this element of the crusade was exclusively responsible for the operation of these machines or if members of other classes were also involved to a certain extent. What is clear is that these aggrieved members of the army performed the lion's share of this onerous task. It can be ascertained from this information that the operation of these machines was, at least to an extent, a relatively unskilled task and possibly one that required the involvement of a large number of people. This fragment of information, therefore, suggests that traction trebuchets may have been employed during the siege of Nicaea.[107] Doubts have been raised about Guibert's reliability on military matters, however, due to his questionable inclusion of a *cuniculum* in attempts to undermine the walls of Nicaea. Consquently, this section might be best treated as an indication of the general nature of artillery use in early

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[106] GN, p. 153.

[107] For a more detailed discussion of this extract from Guibert of Nogent see below, 'Siege of Nicaea: The Aftermath of the Siege', pp. 131-133.

twelfth-century Christendom and not as reliable source for the specifics of events at the siege of Nicaea.

Guibert of Nogent's crusade narrative is available in English in the translation by Robert Levine. The translation of the various terms used by Guibert to depict artillery in the *Dei Gesta* contains a number of inconsistencies. For example, the term *balistae* is translated, on different occasions, as 'crossbows', 'catapults', 'ballistic machines' and 'launchers'.[108] The term 'catapults' is also used, at another juncture, to represent *tormenta* (*Fervere ibi cerneres maximis tormenta lapidibus et non modo parietem muri vexare forasticum*).[109] Clearly, for Levine, as for a number of other modern editors of crusade narratives, the depiction of artillery terms with a consistent and accurate set of translations is not a priority. There are occasions, however, when Levine does, undoubtedly, use the most appropriate term to represent the Latin, as when he renders *fundae* as 'slings.'[110] In general, however, this is not a translation that can be relied upon consistently to provide the best possible translation for artillery terms.

RAYMOND D'AGUILERS, *HISTORIA FRANCORUM QUI CEPERUNT IHERUSALEM*

Although Raymond d'Aguilers's work is not entirely free from the influence of the *Gesta Francorum*, Raymond was also an eyewitness to the events he described and was thus not dependent on the *Gesta*.[111] Raymond was a participant on the First Crusade in the section commanded by Count Raymond of St Gilles & Toulouse and, indeed, he seems to have been chaplain to the count from around the time of the second siege of Antioch.[112] The author tells us that he was a canon of the

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[108] GN, Levine, pp. 62, 65,128, 146, 163.

[109] *Ibid.*, p. 163; GN, p. 346.

[110] *Ibid.*, p. 62.

[111] For a discussion of the use of the *Gesta Francorum* by Raymond see Rd'A, pp. ccxxv-ccxxxvii. This is in contrast to Peter Tudebode who, although also an eyewitness, was dependent on the *Gesta Francorum* in a substantial manner and who is, thus, to be found treated in the '*Gesta Francorum* and Dependent Sources' section above, pp. 20-24.

[112] Rd'A, p. ix; J. Riley-Smith, *The First Crusaders*, pp. 63, 154, 219.

cathedral of St. Mary of Le Puy.[113] He was elevated from his position as a deacon to that of a priest during the second siege of Antioch.[114] Raymond was consequently not only an eyewitness to and participant on the crusade but he was a well-connected man with a contact in the higher echelons of the crusade command, Count Raymond of Toulouse. The *Historia* is available in several editions, the best of which is that edited by John France in 1967.[115]

Raymond d'Aguilers's artillery nomenclature is limited. In the early stages of the crusade he shows little interest in artillery: only one relevant reference appears in his description of the siege of Nicaea and none at all in that of the siege of Antioch. In the later stages of the crusade mentions of artillery are more numerous, however, and overall there are seven uses of artillery terms in five different events.[116] Raymond's account makes equal use of the terms *tormenta* and *petraria*, with each appearing three times. There is also a single isolated use of *balistarii*. This is a term distinct from *balista*, albeit one with clear connections to that term. Lewis and Short's *Latin Dictionary* defines a *balistaria* as 'the place where the ballista is worked'.[117] This is a clear indication that this is not a reference that makes a connection between *balistae* and crossbows. On the contrary, it instead makes a connection between *balistae* and the artillery sense of that term, an issue central to this dissertation. This is perhaps, therefore, an important clue in the vexed question of the correct translation of *balista*.

There is one incident described by Raymond d'Aguilers that may hold the key to understanding his terminology. In the course of his description of the siege of Jerusalem (1099), Raymond relates the story of the death of two women inside the

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[113] Raymond refers to himself as *Raymundus canonicus Podiensis* – Rd'A, p. 5 and ix.

[114] Rd'A, p. ix.

[115] J. Bongars, *Gesta Dei per Francos* (Hanover, 1611); RHC Occ 3, 235-309; *Le 'Liber' de Raymond d'Aguilers*, J. H. Hill and L. L. Hill, eds., (Paris, 1969). Raymond d'Aguilers, *Historia Francorum*, J. France, ed., *Critical Edition of the Historia Francorum of Raymond of Aguilers* (unpublished PhD Thesis, University of Nottingham, 1967) (hereafter Rd'A).

[116] Rd'A, p. 19 –*balistaria*; *Ibid.*, p. 173 – *tormentis*; *Ibid.*, p. 200 – *petraria*; *Ibid.*, p. 339 – *tormentis, atque petrarias*; *Ibid.*, p. 342 – *petrariam, tormento*, both these references are to the one machine.

[117] C. T. Lewis and C. Short, *A Latin Dictionary* (reprint Oxford, 1987), p. 220.

city. He claims that these two women were attempting to cast a spell or curse (*fascinare*) on one of the Christian artillery pieces and were, along with three small girls, killed by a stone thrown from that very same machine.[118] In the course of recounting this event, Raymond refers to the same machine twice in quick succession but crucially uses two different terms. He first mentions a *petraria* before referring to a stone thrown from *eodem tormentum*. There are three possible ways to interpret this. Perhaps this was a stylistic choice. The two references to the artillery piece occur within ten words of one another and it is entirely feasible that Raymond did not wish to repeat a word in the same sentence. Alternatively, it may be that Raymond was ignorant of the proper terms to apply to artillery pieces and that the denoting of one machine with two contradictory terms was an indication of this. Finally it is possible that they were not contradictory terms. Vegetius in his descriptions of artillery uses the term *tormentum* in such a fashion as to suggest that he saw it as a general term for artillery pieces rather than as a word to denote a certain kind of machine.[119] As has been discussed elsewhere, Vegetius's work was widely read and known in the medieval world and it is not unreasonable to argue that his artillery terminology may have been strongly influential in the formation of that of the Middle Ages.[120] As such, it is entirely possible that his understanding of *tormentum* as a general term was still current when Raymond was writing his account in the late eleventh or very early twelfth century. If this were so, there need be no inherent contradiction in Raymond referring to what was clearly one machine with two different terms.

Problems persist with Raymond's terminology, however. While *tormentum* may be a general term for artillery, there is no evidence to confirm that *petraria* is any more than that. It may be the case that Raymond's seven uses of artillery terms yield very little specific information and that the most directly descriptive term in those references is one associated with the extraordinarily awkward term *balista*. As a result, the most concrete statement that can be made about Raymond d'Aguilers's artillery nomenclature is that it is purposefully vague and that his manner of

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[118] Rd'A, p. 342.

[119] Following his description of two types of artillery, the *balista* and the *onager*, Vegetius then made reference to both machines at the same time by saying *his duobus generibus nulla tormentorum*: Vegetius, p. 139.

[120] See above, 'Robert the Monk', pp. 29-30.

applying terms to the machines that he saw with his own eyes is lamentably unenlightening. His description of the action of those machines, however, is an occasionally fascinating area and one that will be dealt with below in the case studies of the First Crusade sieges.

The *Historia Francorum qui ceperunt Iherusalem* is available in a translation edited by John and Laurita Hill.[121] The translation of the various terms for artillery in this work is, for the most part, circumspect. On most occasions where artillery terms appear in the Latin text they are left untranslated in the Hills's edition. For example, *balistarium* is rendered in the English text as 'ballistae' and *tormentis, atque petrarias* as 'from *tormenti* and *petrariae*.'[122] There is one case, however, where *tormentis* is rendered as 'from catapults'.[123] Although this is more than a simple Anglicization of a Latin term – as is common through the rest of the translation – it still cannot be seen as an attempt to identify or define the machine in question. The one occasion in the translation of artillery terms where a clear problem arises is in the rendering of *eodem tormento* at Jerusalem as 'from the same machine.'[124] The term *tormentum* possibly did not have many inherent specific connotations for the morphology of the artillery pieces described but it clearly meant more than 'machine' and in this instance the Hills's translation is unnecessarily vague. Apart from these artillery issues, there are connected problems with other military translations. At the siege of Jerusalem, the translation describes how 'hurriedly Godfrey lowered the drawbridge which had defended the tower,' although there seems to be no mention in the Latin of a drawbridge.[125] Rather than a drawbridge, the Latin tells of the lowering of a *cratis* to bridge the gap between the tower and the walls of Jerusalem.[126] A *cratis* was not a purpose built bridge but rather part of the wickerwork defences of the tower and elsewhere indeed the Hills more correctly translate *cratis* as 'wattle.'[127] This altogether different sense of the creation of a makeshift bridge fits much better with the corresponding sections of

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[121] Rd'A, Hills.
[122] Rd'A, pp. 19, 339; Rd'A, Hills, pp. 25, 125.
[123] Rd'A, p. 173; Rd'A, Hills, p. 78.
[124] Rd'A, p. 342; Rd'A, Hills, p. 126.
[125] Rd'A, Hills, p. 127.
[126] Rd'A, p. 344.
[127] For example: Rd'A, Hills, p. 123.

the other accounts of the capture of Jerusalem.[128] The identification of this piece of material by John and Laurita Hill as a drawbridge reveals a lack of interest in the specifics of the morphology and degree of sophistication of the military equipment of the crusaders and is misleading.

FULCHER OF CHARTRES, *HISTORIA HIEROSOLYMITANA*

Fulcher of Chartres's *Historia Hierosolymitana* provides an account of the First Crusade as well as of the events in the newly formed crusader principalities in the years following the capture of Jerusalem. The edition being used here is the 1913 edition of Heinrich Hagenmeyer.[129] Fulcher's account of the events of the First Crusade was begun in 1101 and the first redaction of the work is likely to have been completed by 1105.[130] The presence of the line *atque finis hic ici* after the description of the third Battle of Ramleh on 27 August 1105 in a close copy of Fulcher's history – Bartolf of Nangi's *Gesta Francorum Iherusalem expugnantium* – may indicate that the histories of both Fulcher, in its first redaction, and Bartolf finished there.[131] Fulcher undertook a second redaction of the work in 1124. That longer account ends with events in the year 1127. Hagenmeyer's edition takes into account both the first and second redactions whereas that in the *Patrologia Latina*

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[128] GF, pp. 466-7; RM, pp. 866-7; PT, pp. 108-9; FC, pp. 299-300; GN, pp. 277-8; BD, pp. 102; AA, p. 428; RC, p. 694. William of Tyre, on the other hand, does make mention of a bridge in his *Historia rerum in partibus transmarinis gestarum* (WT, p. 409) but it seems likely that he was retrospectively applying the methods of war from the period in which he was writing, the second half of the twelfth century, to this earlier period. For more on this see below, 'William of Tyre', pp. 85-86.

[129] Fulcher of Chartres, *Historia Hierosolymitana*, H. Hagenmeyer, ed., (Heidelberg, 1913).

[130] H. Hagenmeyer, Introduction, *Historia Hierosolymitana*, pp. 44-5; FC, Ryan, pp. 19-20; C. Kostick, *The Social Structure of the First Crusade*, p. 41

[131] Bartolf of Nangi, *Gesta Francorum Iherusalem expugnantium*, RHC, Occ 3, 491-543; here p. 541; see also FC, p. 46; C. Kostick, *The Social Structure of the First Crusade*, p. 41.

contains solely a first redaction version.[132] The edition available in the *Recueil des Historiens des Croisades* is edited by Bongars, which was first published in 1611.[133]

Fulcher, a cleric, was an eyewitness for only a part of the First Crusade. Originally a member of the group led by Count Stephen of Blois and Duke Robert II of Normandy, Fulcher later travelled towards Edessa as a member of Baldwin of Boulogne's contingent that, in September 1097, left the main body of crusaders to set off on a different course and eventually established what would become the county of Edessa.[134] Thus while the information presented by Fulcher on the actions of the main body of crusaders before September 1097 is that of an eyewitness, this is not the case for the later parts of the campaign. He did, however, have access to many people who were eyewitnesses to the events he described and, as such, the testimony found in the *Historia Hierosolymitana*, which comes to us from such men through Fulcher, must be treated as important evidence.[135] Despite his proximity to the events he was describing, Fulcher of Chartres still made use of the *Gesta Francorum* in constructing his own narrative.[136] Not a single instance of artillery use reported by the *Gesta Francorum* can be seen as having directly influenced Fulcher of Chartres's writing.[137]

Dealing first only with the later version (1124) of the *Historia Hierosolymitana*, that of the second redaction from Hagenmeyer's edition,

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[132] C. Kostick, *The Social Structure of the First Crusade*, p. 39.

[133] *Fulcherii Carnotensis Historiam*, RHC, Occ 3, pp. 311-485; J. Bongars, *Gesta dei per Francos* (Hanover, 1611).

[134] For more on Stephen of Blois and his letters sent from the crusade, see below, 'Eyewitness Letters from the First Crusade', p. 74. On Duke Robert II of Normandy see: J. Riley-Smith, *The First Crusaders*, pp. 4, 76, 87, 90-2, 104, 141-2, 144, 153, 174, 183, 200, 216, 221, 241; H. Hagenmeyer, *Chronologie*, p. 95.

[135] On Fulcher's career see: H. Hagenmeyer, Introduction, *Historia Hierosolymitana*, pp. 1-19; J. Riley-Smith, *The First Crusaders*, pp. 87, 140, 206; V. Epp, *Fulcher von Chartres: Studien zur Geschichtsschreibung des ersten Kreuzzuges* (Dusseldorf, 1990), pp. 24-45.

[136] J. France, 'The Use of the Anonymous Gesta Francorum in the Early-Twelfth Century Sources for the First Crusade,' in A. V. Murray, ed., *From Clermont to Jerusalem*, p. 30.

[137] For the artillery references from the *Gesta Francorum* see GF, pp. 182, 183, 404. Also see below: 'Siege of Nicaea: Heads Thrown into the City', pp. 119-124; 'Siege of Nicaea: Missile Protection for Underminers', pp. 125-129; 'Siege of Ma'arrat-an-Numan: Defenders' machine to attack siege-tower', pp. 167-174.

references to artillery are rare given the length of the work: in general the *Historia* is little concerned with the minutiae of military affairs. During his narrative of the First Crusade, Fulcher made four uses of terms that are clearly direct references to artillery. There are two artillery references in the course of Fulcher's description of the siege of Nicaea, one each of *petrariae* and *tormenta*, a further appearance of *petrariae* appears at Antioch and, during his account of the siege of Jerusalem there is a third use of *petrariae*.[138] In the period following the end of the First Crusade, Fulcher recorded a further four incidents that definitely involved the use of artillery. In one of these incidents, the siege of Caesarea, *petrariae* are referred to twice.[139] The terminology evident in these three separate events fits well with that observed during Fulcher's account of the First Crusade. No new terms are used to denote artillery in this later period: instead Fulcher makes further use of *petrariae* and *tormenta*. These appearances of artillery in Fulcher's narrative are somewhat thinly spread through the work, however, appearing in the sieges of Caesarea in 1101, Jaffa in 1123, Hasar in 1125 and Raphina in 1126.[140]

Additionally, Fulcher's accounts of the sieges of Antioch, Jerusalem and Jaffa have another possible reference to artillery that is less clear: the incidents in question involved the use of *fundibula*.[141] The manner of the use of the term *fundibula* in other sources causes one to be wary of its appearance. The copious uses of the term by Albert of Aachen, for example, indicate that, in Albert's *Historia* at any rate, *fundibula* should be treated as hand-held slings rather than siege engines.[142] Unlike the use of this term by Albert of Aachen, the appearance of the term in Fulcher of Chartres' work suggests that the author was referring to artillery. In the case of the siege of Antioch Fulcher listed *fundibula* alongside *petrariae* that were used to throw severed heads from the city at the crusaders.[143] It

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[138] FC, p. 186 – *petrarias, tormentis*; *Ibid.*, p. 221 – *petrariis*; *Ibid.*, p. 295 – *petrarias*.
[139] *Ibid.*, p. 401 – *petrarias* and p. 402 – *petrariis*; *Ibid.*, p. 662 – *tormenta*; *Ibid.*, p. 799 – *tormentis*.
[140] *Ibid.*, pp. 401 – *petrarias*; *Ibid.*, p. 402 – *petrariis*. *Ibid.*, p. 662 – *tormenta*. *Ibid.*, p. 764 – *tormentis*. *Ibid.*, p. 799 – *tormentis*.
[141] Respectively: *Ibid.*, p. 221; *Ibid.*, p. 296; *Ibid.*, p. 586.
[142] See below, 'Albert of Aachen', pp. 69-70.
[143] FC, p. 221; also see below, 'Siege of Antioch: Throwing of Heads by the Defenders', pp. 137-138.

does not matter that Fulcher, who was not an eyewitness, may not have been aware of specifically what machines or weapons were used to accomplish this act. His use of the term *fundibula* to describe those weapons indicates that he felt that they would have been capable of such a feat. The throwing of a head which along with the neck has a weight of between four and six kilograms, is something unlikely to have been easily accomplished by a hand-held sling.[144] Thus the use of the term at Antioch would suggest that Fulcher's *fundibula* were on a different scale from the *fundibula* mentioned by Albert of Aachen and that they should be treated as artillery. This contrast in the use of the same term by two of the major authors of the First Crusade narratives reflects the problems involved in assessing the nature of medieval artillery by using such narratives.

In the case of the siege of Jerusalem, however, Fulcher wrote that the *fundibula* were employed by the city's defenders to throw *ignem... cum faculis aptatis* at the crusaders attacking on siege-towers.[145] This casts a different light on the weapons from the perspective evident from Antioch: the use of these weapons to throw torches does not convey the sense of an artillery piece. Similarly his account of an attack on Jaffa by forces from Ascalon in 1115 reports the use of *fundibula* in a manner that again does not suggest that they necessarily possessed much power.[146] The fashion in which he employed the term is interesting in that it is not as an aspect of a well established siege but, rather, as part of a surprise attack. The attackers had been assaulting and blockading the city in a more concerted manner but were forced to retire due, according to Fulcher, to the threat of a relief force from Jerusalem. Their retreat was only temporary, however, and after a reported ten days' absence they returned, hoping to find the city over-confident after fending off the previous assaults and unprepared for such a surprise attack. It was in this second brief attack that the Ascalonites made use not only of *scalae* but

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[144] W. T. Dempster & G. R. L. Gaughran, 'Properties of body segments based on size and weight', *Americal Journal of Anatomy*, 120 (1967), p. 52 - the exact weight range of a human head provided in this study is 5.119kg ± 0.838kg.

[145] FC, p. 296; also see below, 'Siege of Jerusalem: Artillery Involvement in Siege-tower Attack', pp. 194-209.

[146] FC, p. 586; also see below, 'Siege of Jaffa (1115)', pp. 279-281.

also the aforementioned *fundibula*.[147] If, as seems likely, this second assault was intended to capitalise on the element of surprise, there would have been little place in the attack for large, awkward or immobile siege engines. Their use of *scalae*, which are easily transported, fits well with this. Consequently, although there is no explicit evidence in the examples of Fulcher's use of the term *fundibula* at the sieges of Jerusalem and Jaffa to suggest the use of a machine of particularly significant size, the very precise use ascribed to these weapons at Antioch indicates the use of notable power to project heads from the walls towards the Christians. Although it is not the case with Albert of Aachen's *Historia*, therefore, the appearance of *fundibula* in Fulcher's work are treated as artillery references in the case studies section of this thesis. It must be noted, however, in the case of Jaffa especially that these were unlikely to have been large machines since that would not correlate to the nature of some of the elements of their use. They seem to have been small, easily transportable artillery pieces.

The changes in the text of the *Historia* between the first and second redaction, both of which it is possible to investigate through use of the varient apparatus in Hagenmeyer's edition, have relevance for the study of artillery in the work and the differences between the two forms of the account must be recognised. One of the early references to artillery in the work, an example of artillery use at the siege of Nicaea, changed in Fulcher's second redaction:

First Redaction:	**Second Redaction:**
Tunc heroes nostri fecerunt machinas fieri, arietes, scrofas, turres ligneas, *petrarias*. Distendebantur arcubus sagittae, jaciebantur lapides, hostes nobis nosque illis vicem certaminis pro posse reddebamus.[148]	Tunc heroes nostri fecerunt machinas fieri, arietes, scrofas, turres ligneas, *petrarias*. Distendebantur arcubus sagittae, *tormentis* iaculabantur lapides, hostes nostri nobis nosque illis vicem certaminis pro posse reddabamus.[149]

It can be readily observed in this comparison that there is no reference in the first redaction to the presence of *tormenta* at this siege whereas there is in the second redaction. A further examination of the terminology in the two redactions reveals

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[147] Fulcher's account states that the assaulting forces attacked for four hours before retiring.
[148] FC, Patrologia, col. 835.
[149] FC, p. 186; also see below, 'Siege of Nicaea: Construction of Equipment and Attacks on the City following the Battle', pp. 113-117.

that all of Fulcher's references to *tormenta* appear only in the second redaction. In the example above the phrase was added into an existing passage of the work whereas the later appearances of *tormenta* in the account occur at sieges that took place too late to be included in a work composed in 1105: the sieges of Jaffa, Hasar and Raphina in 1123, 1125 and 1126 respectively. Likewise, there was no further use of *petrariae* in the second redaction while not removing the previous uses of the term from the work, Fulcher did not use it again in the *Historia*.

There are thus three clearly distinct terms used in Fulcher of Chartres's *Historia Hierosolymitana* to indicate the presence and use of artillery: *petrariae*, *tormenta* and *fundibula*. Indeed, they occur almost in equal measure, *petrariae* appearing four times and *tormenta* and *fundibula* three times each. The appearance of the terms *petrariae* and *tormenta* virtually side-by-side during Fulcher's second redaction of his description of the siege of Nicaea makes the specificity of his nomenclature even more uncertain and is central to understanding his artillery nomenclature. In this instance, the account mentions the construction of *petrariae* and, almost immediately, the use of *tormenta* against the city and its defenders. Though it could be argued that perhaps Fulcher's terminology changed between 1105 and 1124 due to developments either in artillery terminology or technology, the apposition of these terms from opposite sides of the redaction divide indicates that Fulcher had little interest in exactness in artillery terminology. To ascribe the switch from the use of *petrariae* to *tormenta* to a wider change in artillery terminology or to developments in military technology and typology would be to credit Fulcher of Chartres with a strong interest in and knowledge of artillery in the period; but this is not borne out by the example of artillery at Nicaea. The omission in the text of the second redaction of *tormenta* from the list of machines constructed at the outset of the siege may suggest that these artillery pieces were one and the same as those constructed but denoted by the noticeably different term, *petrariae*.[150] Had Fulcher possessed a significant interest in or knowledge of artillery, this dubious phrasing would have appeared to him as requiring correction. The subsequent addition of a new term and the apparent resulting contradiction in terms

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[150] FC, pp 186-7; also see below, 'Siege of Nicaea: Construction of Equipment and Attacks on the City following the Battle', pp. 113-117.

reveals that Fulcher's terminology is unlikely to be useful in the identification of artillery typology. Thus, with the possible exception of the use of the term *fundibula*, where information about typology is inherently engrained in the word itself, Fulcher of Chartres' *Historia Hierosolymitana* displays an artillery nomenclature that provides little sense that he aimed to convey technical or typological information in the titles ascribed to machines. Although there was a clear system for terminology, evident by the changes between the first and second redactions, most appearances of artillery-specific terms in the *Historia* could well be written off as general terms as opposed to specific, technical terms. The change in choice of terminology visible when comparing the two redactions of Fulcher of Chartres' work indicates that the author was not concerned with the accurate depiction of artillery typology through the application of specific, technical terms. The artillery of the First Crusade can be seen from the evidence of the narratives sources to have involved more than one type of machine, but this fact is not reflected in the nomenclature of Fulcher of Chartres, which, instead, appears to reflect a desire to indicate the presence of artillery in general but little more.[151]

There are two main translated versions of this work in English – that translated by Martha McGinty and that by Frances Ryan. Neither of these works engages much with the terminology of artillery. The general approach taken by both is to avoid actual translation, presenting Fulcher's Latin terms in the nominative case, without trying to adapt them into a more modern descriptive term for artillery. The one exception occurs in McGinty's translation of Fulcher's account of the siege of Jerusalem. Where Fulcher reported the use of *petrariae* by the crusaders, McGinty's translation talks of the use of 'machines'.[152] Ryan has clearly made use of McGinty's version in the translation of her own; both the versions have footnotes at the first references to artillery and in Ryan's version, which is almost identical to that of McGinty, McGinty's edition is referenced.[153] The information contained in those footnotes postulates that the *petraria* mentioned by Fulcher of Chartres was, according to McGinty, 'a machine for throwing stones' or, in Ryan's words, 'apparently a mangonel or machine for hurling stones.' The *tormenta* mentioned in

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[151] See below, 'First Crusade Case Studies: Conclusions – Typology', pp. 214-226.
[152] FC, p. 295; FC, McGinty, p. 67.
[153] *Ibid.*, p. 32, n. 3; FC, Ryan, p. 82, n. 5.

the same paragraph of Fulcher's work are noted by McGinty as siege-engines that 'hurled missiles by the use of twisted cords.' Ryan follows this closely by stating that a *tormentum* 'was probably a stone-throwing lever powered by twisted ropes.' That a *petraria* threw stones is entirely uncontentious, though the same cannot be said for the assertion that the term *tormentum* indicated the presence of an *onager*. Ryan's information on this matter appears to derive solely from McGinty's edition, which, for information on this military equipment, only references Duncalf's 1912 article. The reliance on this article is questionable as, although Ducalf indeed provides the assertion that *tormenta* hurled rocks by employing the power of twisted ropes, he provides no discussion on this matter and does not show any evidence to back up the assertion.[154] His contention, expressed in the same article, that the crusaders' siege-towers at Jerusalem included purpose built bridges to allow for the troops to access the city's walls is incorrect and casts doubt on the merit of his knowledge of the military equipment employed in the First Crusade.[155] There seems little reason for these editions of Fulcher of Chartres' work to rely on such a dated article for their information on the crusaders' military apparatus.

ALBERT OF AACHEN, *HISTORIA IEROSOLIMITANA*

Like that of Fulcher of Chartres, Albert of Aachen's account of the First Crusade does not end with the fall of Jerusalem but it continues to detail the events that followed that crusader triumph. His *Historia Ierosolimitana* ends with an account of events around Easter 1119, during the reign of King Baldwin II (1118-1131).[156] The *Historia Ierosolimitana* is the account of the First Crusade with the most abundant detail of the military affairs of the campaign and this is especially

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[154] F. Duncalf, 'A problem in the use of parallel source material in medieval history: the capture of Jerusalem in 1099', *Bulletin of the University of Texas*, no. 224 (March, 1912), p. 20, n. 12.

[155] *Ibid.*, p. 17, n. 5; Although William of Tyre refers to the use of a bridge to access the walls from the crusader siege-tower (WT, p. 409) but the more contemporary soruces for the event do not mention any bridge. See above, 'Raymond d'Aguliers', p. 49.

[156] On Baldwin II see: J. Riley-Smith, *The First Crusaders*, pp. 8-10, 160, 162, 169-80, 182-7, 190, 198, 200, 244-6, 248.

the case with regard to mentions of artillery, which are vastly more numerous in this work than in those of other authors who left accounts of the First Crusade.

Albert of Aachen's account of the First Crusade is contained in the first six books of this twelve-book work. Those early books are likely to have been written in the early years of the twelfth century, soon after the events described.[157] Book VI of the *Historia Ierosolimitana* has been identified by Susan Edgington as having been completed after the year 1102.[158] The evidence provided by the prologue suggests that Albert wrote the earlier parts of the work without knowledge of the achievements and actions of the crusader states after the initial successes of the First Crusade.[159] This indicates that Albert wrote the First Crusade section of the work before news of those later events had filtered back to Lotharingia. As a result, a date of composition of the First Crusade part of the work is in the very early years of the twelfth century but after 1102. Thus, in terms of dating, therefore, this is not a work that was much removed from the events it described but in terms of geography Albert of Aachen was far removed from the First Crusade. Aachen was in the archdiocese of Cologne in Lower Lotharingia, which was the western most region of the German kingdom, and it was there that Albert – not an eyewitness to the major events of the First Crusade – wrote his *Historia*. As a result, in writing the *Historia Ierosolimitana*, Albert of Aachen was primarily reliant on the testimony of returning crusaders and, indeed, at many junctures in the course of the work he refers to eyewitness accounts.[160] Although there are no incidents involving artillery for which Albert directly states that he received evidence from eyewitnesses, there are points during both the sieges of Nicaea and the protracted events and sieges at Antioch at which Albert points out his access to eyewitnesses.[161] There is, however, also some evidence to suggest that Albert made some use of the *Chanson d'Antioch*, a *chanson de geste* of *circa* the late twelfth century, in writing his work, as well as being influenced by other *Chansons de Geste*.[162] By bringing together the accounts

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[157] AA, Introduction, p. xxiv.
[158] *Ibid.*, p. xxv.
[159] *Ibid.*, p. xxiv.
[160] S. Edgington, 'Albert of Aachen and the *Chansons de Gestes*', in J. France and W. G. Zajac, eds., *The Crusades and their Sources*, p. 29 and n. 30.
[161] AA, pp. 118, 244, 333, 335.
[162] S. Edgington, 'Albert of Aachen and the *Chansons de Gestes*', pp. 28-30.

of various returned crusaders and by not relying on the account in works such as the *Gesta Francorum* as other European-based chroniclers did, the *Historia Ierosolimitana* provides an independent account of the course and events of the First Crusade and the following years up until 1119. This independence is, at a number of junctures, very important in providing information and verifying the accounts of critical events connected with artillery use in this period. Though there are occasional problems when comparing the chronology of Albert of Aachen with that of the *Gesta* sources, the version of events provided by Albert of Aachen can, by comparison to those other accounts of the First Crusade, be seen to be a reliable source of information.

Albert of Aachen made far more references to artillery in his *Historia Ierosolimitana* than any of the other authors for the First Crusade did in their respective writings. In all, artillery references appear seventy times in the work. These seventy references occur in the course of fifty-seven separate incidents primarily spread out over twenty-two sieges.[163] There is a clear concentration of artillery terms in the more detailed section of Albert's work that describes the sieges of the First Crusade but Albert also maintains a high rate of artillery references in his account of the later sieges of his work, including many sieges that are reported by Fulcher of Chartres without any references to artillery. It is clear from the profusion of references that artillery was an area that interested Albert greatly.

Of these many references a large proportion contain uses of the term *mangena*. The term can be found thirty-eight times in the *Historia* over the course of twenty-six incidents.[164] The sheer number of occurrences of the term raises a number of possibilities when interpreting its use. It may indicate that there was one particular type of artillery that dominated the typology of artillery of the Christian campaigns in Outremer in this period and that this particular type of artillery was denoted by the term *mangena*. It could also be argued that this was some sort of generic term for Albert of Aachen, one that he used when he needed a general term

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[163] See below, 'Appendix: Albert of Aachen's Artillery Nomenclature', pp. 325-343.
[164] AA, pp. 112, 174, 176, 202-4, 210, 376, 406, 408, 414-6, 422-4, 426-8, 486, 488, 516, 566, 660, 662, 720, 731, 738, 760, 782, 824.

to denote artillery without being specific regarding the typology of the machinery in question. Another German author has a key line to add to this discussion: Berthold of Reichenau in his chronicle, composed *circa* 1080, referred to *machinamentis balisticis quae mangones teutonizant*.[165] This reference from Berthold makes a clear connection between *mangene* and the Germans, indicating perhaps that Albert of Aachen's reason for using this term with such frequency was that it was the common term among those influenced by the Germans or the German language in this period. This possibility is furthered by the strong presence of that same artillery term in 'the Lisbon Letter' pertaining to the 1147 siege of Lisbon, another source of Germanic provenance.[166] *Mangene* are defined by DuCange as *machinæ bellicæ jaculatoriæ*.[167] Of course, that this is a German term does not preclude it from being a term with specific technical and typological information attached. Though it cannot be conclusively proved whether or not this is a generic term, the possibility makes it awkward to base any solid typology related conclusions on the appearance of this term. Although there are points where the term *mangena* is accompanied by enough information on the working of the machine in question to allow for the postulation of the typology of the machine concerned, it is difficult to use such incidents to postulate that all the occasions in which the term appears is a reference to the same kind of machine without further evidence.

Together with the plethora of references to *mangene*, Albert of Aachen's work mentions the use of *mangenelle* as missile weapons.[168] The dictionaries of both DuCange and Niermeyer define a *mangenella* as a diminutive form of a *mangena*.[169] The small nature of the weapons is born out by one of Albert's uses of the term wherein he mentions *fundibulis aut paruis mangenellis*.[170] The significance

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[165] Berthold of Reichenau, *Chronicon* in I.S. Robinson, ed., *Die Chroniken Bertholds von Reichenau und Bernolds von Konstanz, Monumenta Germaniae Historica, Scriptores rerum germanicarum, nova series*, 14 (Hanover, 2003), p. 360.

[166] See below, 'The Lisbon Letter', pp. 77-79.

[167] C. DuCange, *Glossarium mediae et infimae Latinitatis*, II, (Frankfurt 1710) col. 427.

[168] AA, pp. 210, 424, 488, 566, 622, 760.

[169] C. DuCange, *Glossarium mediae et infimae Latinitatis*, II, col. 427; J. F. Niermeyer & C. Van de Kieft, *Mediae Latinitatis Lexicon Minus*, II (Leiden, 2002) p. 832.

[170] AA, p. 424.

of this instance is increased by the manner in which descriptions of *mangene* and *mangenelle* occur in quick succession. The five hundred words preceding the reference to the *parva mangenelle* contain no fewer than ten references to *mangene*. This apposition of the two machines and the recognition of their use in separate manners are crucial as they exhibit an evident differentiation of the two machines in Albert's mind. The description of these weapons as *parva* by Albert and as smaller *mangene* by both Niermeyer and DuCange while the term *mangenella* clearly maintains an etymological connection with *mangena* is important. There is a distinct possibility of a connection in the morphology of *mangene* and *mangenelle*. The nature of some of the descriptions of these weapons supports this. In the mention of *mangenelle* quoted above, the *parva mangenelle* are clearly equated with the *fundibula*. Similarly, Albert contains a description of a captured messenger being thrown towards the walls of Jerusalem by a *mangena* as a form of execution during the 1099 siege of that city.[171] Albert related that this man was placed in the *pelis* of the *mangena*. In a parallel account of that event, Peter Tudebode made it clear that this *pelis* was a *funda*.[172] There is, therefore, an identifiable relationship between both these forms of weaponry and slings. Consequently, there is a possibility that Albert of Aachen in using these two interconnected terms in similar ways, while still acknowledging the differences in scale between them, was aware of the assertions his work made regarding artillery morphology and typology as a result of the manner in which he used the terms *mangena* and *mangenella*.

Another term denoting missile weapons, *fundibula*, appears a total of twelve times in Albert of Aachen's work.[173] Though not unique to Albert of Aachen, this is not a term that appears in many of the First Crusade sources in connection with artillery.[174] The term is connected to Albert's use of the term *mangenella* but it is not a term that can be tied comprehensively to artillery. Consequently, the incidents in which Albert applied the term need to be assessed to ascertain what, if any,

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[171] *Ibid.*, pp. 420-2. See also, 'Siege of Jerusalem: Messenger/Spy thrown toward city', pp. 185-189.
[172] PT, p. 107.
[173] AA, pp. 194, 406, 424, 464, 470, 488, 520, 566, 640, 710, 732, 756.
[174] Fulcher of Chartres is the other important crusade author to do so: FC, pp. 221, 296, 586. For a discussion of the use of the term in Fulcher's work see above, pp. 52-54.

connection there is between the term *fundibula* and artillery. A perusal of the uses of the term *fundibula* in the *Historia Ierosolimitana* makes it clear that there is often little evidence of an artillery connection. The appearance of these weapons in the text is inconsistent with the use of artillery since, while certain artillery devices appear only in siege situations, *fundibula*, as well as being depicted in use during sieges, are also identified in battles, such as those at the bridge of Antioch and one in the mountains near Jerusalem, and in naval warfare.[175] Artillery's lack of mobility makes its use too cumbersome in battle and, as a result, the frequent use of *fundibula* in these theatres of warfare sets them apart from artillery in Albert of Aachen's *Historia Ierosolimitana*. There is, however, one incident that casts doubt on this. A particular mention of *mangenelle*, or small *mangene*, makes a connection between them and *fundibula: fundibulis aut paruis mangenellis*.[176] The link between *fundibula* and *mangenelle* is difficult to rationalise. The term *mangenelle* suggests that those weapons had the same morphology of *mangene* even though they differed in size. There is no occasion in any of the other occurrences of that term to indicate that they were anything other than small artillery pieces. This does not fit with the uses of the term *fundibula* which were often associated with non-artillery weapons. The manifold uses of these adaptable weapons signify that they were certainly smaller than artillery siege engines and that on occasion the term *fundibula* was probably used to indicate the presence of hand-held slings rather than large machines. The presence of a connection with *mangenelle*, which are likely to be complex pieces of machinery, albeit small ones, clouds the issue only slightly.

The second most common term used by Albert of Aachen was *tormentum*. In total the term was used seventeen times over the course of Albert's *Historia*.[177] Even a quick perusal of the manner in which this term was used allows for the observation that the frequency of the appearance of this term increases in the later parts of the work. Throughout the first eight books of Albert of Aachen's twelve-book work there were only five uses of the term, two in book II, one in book VI and a further two in book VII. This sparse spread of the term is in sharp contrast to the

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[175] AA, pp. 194, 640, 732.
[176] *Ibid.*, p. 424.
[177] *Ibid.*, pp. 110, 112, 422, 502, 516, 646, 670, 720, 756, 788, 804, 806, 820, 830, 852.

use of the term in books nine to twelve where Albert made use of the term no less than twelve times. As is the case of the use of *mangena* by Albert of Aachen, one must ask whether this observable phenomenon in the use of artillery terminology reflects a stylistic choice on Albert's part or whether it indicates a change in the actual artillery pieces used at the sieges detailed in the later books of the work. The nature of Albert of Aachen's authorship also requires consideration. As a narrator removed from crusading events and working with second-hand information, Albert of Aachen may well have been significantly influenced in his terminology by the specific experiences of the particular people providing him with information. The information he received would have been limited to the viewpoints of those returning crusaders with whom he came into contact. This may not have been a representative group of crusaders and, as a result, the volume of information obtained would have been skewed, particularly in favour of the German contingent of the crusade. Thus, there are a number of factors that may have influenced the changing pattern of the use of *tormenta* as a term to describe artillery in Albert's *Historia*. What can be said with confidence about the term is that it was consistently used to describe stone-throwing engines. In fifteen of the seventeen appearances of the term, *tormenta* is used with *lapides* in the form *tormenta lapidum*.[178] This common combination of terms strongly indicates that *tormenta* were generally involved with stone throwing.

The need for caution when dealing with either of the terms *mangene* or *tormenta* is highlighted by such incidents as that at the siege of Nicaea where Albert of Aachen's account can be seen to have used the terms *mangene* and *tormenta* in such a manner that identifies one or both of these words as a generic term. During his account of that siege Albert wrote of *duobus tormentis lapidum que uulgo dicuntur mangene* being used by Count Raymond of Toulouse to attack one of the city's towers.[179] The phrasing is such that either of the two terms used in this quotation could be argued to have been a general term. There is a similar issue with the appearance of the phrase *tormento cuisdam mangene* at the siege of

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[178] *Ibid.*, pp. 110, 112, 502, 516, 646, 670, 756, 788, 804, 806, 820, 830, 852.
[179] *Ibid.*, p. 112; also see below, 'Siege of Nicaea: Count Raymond's Artillery Assault on a Mural Tower', pp. 124-125.

Jerusalem.[180] The recurrence of the combination of the terms in describing the one machine suggests that this was not an accidental contradiction by Albert of Aachen and that these terms could be used to refer to one and the same machine. It is also worth noting that, in the second of the two examples on this occasion, the artillery piece in question can, with a large degree of certainty, be identified as a traction or hybrid trebuchet.[181] It has been noted that the references to *tormenta* are, in the vast majority of cases, accompanied by reference to *lapides*. One of the exceptions to this common combination of terms, however, is important for the understanding of the nature of the term *tormentum*. The incident in question is the description by Albert of Aachen of the construction by King Baldwin I of *machinas et plurima tormentorum genera* in 1106 in preparation for a planned siege of Sidon.[182] This is a rather different usage of the term *tormenta*. It suggests that there are many types of *tormenta* and, thus, it appears that it is this term, rather than *mangene*, that best fits as a general term in the cases discussed above. Though *tormenta* can be identified as stone-throwing engines, the usage of the term in the description of preparations for the assault on Sidon is quite clear in its meaning; *tormenta* was a general term that could be applied to many different types of stone-throwing engines. This does not, however, exclude *mangena* from its possible designation as another general term. The similarities that are evident in Albert's usage of both *mangena* and *mangenella* may go some way to suggesting that Albert had a specific meaning in mind when he used the term *mangena*. As was pointed out above, at a number of points both the terms *mangena* and *mangenella* are mentioned by Albert in connection with *fundae*.[183] The possibility raised by Albert's use of *mangena* and *mangenella* that he had a clear understanding and terminology system in mind when using those terms is made more pertinent when one considers that at one point in his description of the siege of Jerusalem, Albert uses the term *mangene* to describe a traction trebuchet.[184] The identification of a traction trebuchet in that instance is based on the use of human strength in the operation of the artillery piece in

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[180] AA, p. 422.

[181] See below, 'Siege of Jerusalem: Messenger/Spy thrown toward city', pp. 185-189.

[182] AA, p. 720; also see below, 'Abandoned Plan to Besiege Sidon', pp. 251-253.

[183] See above, pp. 61-62.

[184] See below, 'Siege of Jerusalem: Messenger/Spy thrown toward city', pp. 185-189.

question. If, therefore, Albert had a clear and consistent meaning in mind when referring to *mangene* then it is possible that every use of the term was a reference to traction trebuchets. This is consistent both with the connection of that term to *fundae* as well as with the fact that traction trebuchets can be identified with more certainty and at more points in the half century covered by this study than any other artillery type.[185] The regular appearance of these machines in the evidence from numerous sources points toward a consistent use by the crusaders of that type of artillery which would fit well with Albert's frequent application of the term *mangene*. As has already been pointed out, arguing that every appearance of the term *mangene* shows the presence of a particular type of artillery, although tempting, is problematic and one must be refrain from making such an argument as it would be impossible to prove conclusively.[186]

Combined, the references to *mangene* and *tormenta* make up almost ninety percent of the total references to artillery in the work.[187] There are, however, some other, crucial terms applied to artillery in the course of Albert of Aachen's narrative. The appearance of the term *balistae* in Albert of Aachen's work is important. All of the incidents in which it appears in the context of the First Crusade, however, are grouped at the start of that crusade, during Albert's accounts of the sieges of Nicaea and Antioch. In a work that, as noted above, has seventy references to artillery, references to *balistae* make up a very small portion of that total. This makes the term *balistae* an intriguing and unique case in the consideration of Albert of Aachen's artillery nomenclature. It must be asked, why did he choose to use this term only in these limited cases and not more frequently throughout the work? There are three terms that provide deviations from the two dominant terms, *mangene* and *tormenta*. The clearly non-specific terms *machine* and *instrumenta* account for three of the nine deviations in the work, *machine* being twice used in a manner that is clearly identifiable as denoting artillery and

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[185] See below: 'Siege of Nicaea: The Aftermath of the Siege', pp. 131-133; 'Siege of Antioch: The Treatment of the Christians Within Antioch', pp. 148-152; 'Siege of Jerusalem: Messenger/Spy thrown toward city', pp. 185-189; 'Siege of Lisbon: Organisation and Effect of the Artillery Crews', pp. 305-306.

[186] See above, p. 60.

[187] They account for sixty-one of seventy clear references to artillery or 87.14%; for full list of Albert's artillery terminology, see below, 'Appendix: Albert of Aachen's Artillery Nomenclature', pp. 325-343.

instrumenta being used once in such a manner.[188] These are not artillery terms *per se* but, rather, terms for siege-engines that on occasion were used to denote artillery. This marks *balistae* apart as a deviation from the normal terms used in Albert's narrative. It is a term that can refer to a specific type of artillery and occurs more frequently than clear artillery usages of *machine* or *instrumenta*. The manner in which the use of *balistae* in the course of Albert's account of the First Crusade closely follows the patterns also visible in Robert the Monk and Ralph of Caen: that is, they are concentrated in the accounts of the sieges of Nicaea and Antioch, which suggests that this is not a random use of the term.

The term is problematic, however, in that some scholars argue that it is better to translate *balista* as 'crossbow' rather than as an artillery piece or at least urge caution about the interpretation of the term.[189] This problem is diminished somewhat by the application of the term in ways that clearly depict artillery actions rather than those of crossbows. There is one indisuptable example of this in the work of Albert of Aachen that comes from the siege of Nicaea where the use of *balistae* is included in a list of major actions and exertions by the besieging crusaders in their attempts to capture the city: *quia nullo conamine machinarum aut balistarum aut impetu uirium, muris aliquam lesionem inferred poterant.*[190] To be included in a list alongside *machine*, the most common usage of which was to denote large engines such as siege-towers, and a 'valiant assault' (*impetu uirium*) both of which were significant elements of the poliorcetics employed at Nicaea, indicates the large nature of the *balistae*. This was not a list of all the weapons and small arms that were employed in the course of the siege but a list of the major weapons and actions of the attackers. The failure of these methods necessitated the construction of a *mirificum instrumentum* in an attempt to advance the cause of the crusaders at Nicaea.[191] Presenting *balistae* in a manner which portrays them as artillery pieces does not necessarily mean that the machines in question were

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[188] AA, p. 488 – *machine*; *Ibid.*, p. 788 – *machine*; *Ibid.*, p. 114 – *instrumenta*.
[189] J. Bradbury, *The Medieval Siege*, pp. 250-1; R. Rogers, *Latin Siege Warfare in the Twelfth Century*, pp. 256-7; S. Turnbull, 'Crossbows or Catapults? The Identification of Siege Weaponry and Techniques in the Chronicle of Henry of Livonia,' in A. V. Murray ed, *The Clash of Cultures on the Medieval Baltic Frontier*, pp. 307-20.
[190] AA, p. 120.
[191] *Ibid.*, p. 122.

artillery pieces in the classical sense of the term but the coincidence of terminological patterns across three sources – Albert of Aachen, Robert the Monk and Ralph of Caen – suggests that the possibility that these were references to *balistae* of the classical type cannot be ignored. This is particularly possible as there is a clear description of the classical *balista* in Vegetius's military treatise, *De re militari*, a work to which Albert may possibly have referred to at one point during his narrative.[192] Although this is the only clear example of the term *balista* appearing in an artillery sense in Albert's narrative, there is no firm evidence on any of the five other occasions that Albert used the term *balista* that he did not see that word as an artillery term.

As mentioned above, in the case of the term *balistae*, there is an argument that it may be best interpreted as 'crossbows' rather than as artillery pieces. It is clear from the appearances of the term in the narrative of Albert of Aachen, however, that there are instances of its use where there is no doubt of its use as an artillery piece or pieces. This leaves the question of whether or not crossbows make an appearance in the work. If there were another term that could be identified as denoting the presence of crossbows in the *Historia* of Albert of Aachen, it would lend further weight to the interpretation of *balistae* as artillery pieces when they appear in the work. One possible term to be identified with crossbows is *arcus Balearis*; the phrase appears seven times in the course of the work.[193] The obvious presence of *arcus* in the term shows that these were bows of some sort. Susan Edgington seems to consider that this term did, indeed, mean 'crossbow', as the English translation in her edition of Albert of Aachen's narrative she consistently renders the phrase thus.[194] It is evident that the fashion in which the use of *arcus Balearis* was described fits well with the nature of crossbows. At the siege of Sidon in 1110, Albert described the use of a siege-tower and the actions of the men inside it thus:

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[192] *Ibid.*, p. 374. For a discussion of Vegetius's description of a *balista* and of the availability of his work in the Middle Ages see below, pp. 215-216.

[193] AA, p. 118, *arcu baleari*; *Ibid.*, p. 202, *sagittis et baleari arcu*; *Ibid.*, p. 416, *baleari arcu intorsit*; *Ibid.*, p. 424, *baleari arcu*; *Ibid.*, p. 662, *arcu Baleari*; *Ibid.*, p. 806, *arcu Baleari*; *Ibid.*, p. 832, *arcu Baleari*.

[194] *Ibid.*, p. 119, p. 203, p. 417, p. 425, p. 663, p. 807, p. 833.

machinam multis diebus compositam muro applicantes, uiros in *arcu baleari* in ea posuerunt, qui altitudine soliorum machine eminentes desuper muros per urbem et turres et eius menia speculatentur[195]

The use of *arcus Balearis* inside a siege-tower succinctly demonstrates that these were not artillery pieces but weapons that could be used to shoot missiles from a confined space. There are also a number of points where Duke Godfrey of Bouillon, duke of Lower Lorraine and later Advocate of the Holy Sepulchre, is reported to be operating an *arcus Balearis* on his own, thus further indicating that these were personal weapons that might have been crossbows.[196] Though this mode of operation fits well with crossbows it must be noted that it also fits with the use of normal bows and cannot, therefore, be used as conclusive evidence that these were crossbows. As a result, further information is needed if the nature of Albert's *arcus Balearis* is to be ascertained. The adjective *Balearis* presents an interesting enigma: an adjective connected with ballistic weaponry the impact of its presence alongside *arcus* is debatable. The people of the Balearic Islands were renowned in the classical world as expert slingers, mentioned by Livy, Strabo and Vegetius, the late classical author of a crucial military treatise.[197] Crucially, the connection is also made in Vergil's *Georgicon*.[198] Vergil is an author to whom Albert is known to have alluded on thirty-three occasions.[199] The link between the Balearic Islands and ballistic weaponry is also made clear in Isidore of Seville's *Etymologiae*.[200] This well known work survives in a thousand medieval manuscripts and is known to have been widely read through the Middle Ages.[201] That connection between the Islands and, by association, the adjective *Balearis* with ballistic weaponry is made clear in works as important as these means that it is not surprising that this term has infiltrated itself into the nomenclature associated with artillery. There is no indication in the work of either Vergil or Isidore of the typology or morphology of

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[195] *Ibid.*, p. 806.
[196] J. Riley-Smith, *The First Crusaders*, pp. 18, 30, 63, 70, 84-6, 96, 111, 125, 128, 141, 146, 171, 200, 209, 222, 227, 229-32. AA, pp. 118, 416. 424.
[197] Livy, *Ab Urbe Condita*, 21, 22. Strabo, *Geographica*, 3, 5. Vegetius, p. 19.
[198] Vergil, *Georgicon*, 1, line 309.
[199] AA, pp. 24, 30, 38, 40, 72, 116, 124, 130, 140, 134, 256, 258, 282, 302, 370, 380, 388, 430, 450, 462, 572, 578, 612, 638, 698, 770. See also AA, p. xxiv, where Edgington talks of Albert's superficial knowledge of the classics that may have been acquired either in the classroom or through use of *florlegia*.
[200] Isidore of Seville, *Etymologiarium*, ed. W. M. Lindsay, 14, vi, lines 47-51.
[201] J. N. Hillgarth, 'Isidore of Seville', *Dictionary of the Middle Ages*, VI (New York, 1985), p. 564.

the weapons discussed in relation to the Balearic Islands. If, therefore, the proliferation of the adjective *Balearis* in medieval sources is due to its use in important classical or early medieval texts, there is no reason to believe that the authors using the term were intending to convey any specific information about artillery typology or morphology. It would seem that the adjective merely shows that a particular machine hurled missiles and perhaps indicates the presence of a sling as part of those machines.

The translation of the terms for artillery is usually consistent in the work. *Tormentum* is consistently rendered with general English terms such as 'catapult' and 'stone hurler' or 'stone thrower.'[202] There is one occasion, however, where the term is rendered inexplicably as 'slings.'[203] The usual regularity of translation punctured with occasional unusual interpretations is repeated in Edgington's translation of the term *mangene*. On forty-two of the forty-four occasions in which the term was used by Albert, Edgington translated it as 'mangonel.'[204] There are two instances of the term being translated as 'ballistas.'[205] These deviations from the norm established in the rest of the translations are curious. There is no immediately apparent reason why in these two instances the term *mangene* merits a different interpretation than on the other occasions. It is also notable that Edgington's translation makes no distinction between *mangene* and *mangenelle* that is rendered as 'mangonel' in every one of the six instances that it appears in.[206] Finally, the translation of *balistae* must be taken into account. This is the most eratically translated of the various artillery terms utilised by Albert. Over the course of six renderings three different terms are applied to *balistae*: 'catapult', 'crossbow' and 'ballista.'[207] This inconsistent approach to expressing *balistae* in English is indicative of the problematic nature of the term. 'Catapult' would seem to fit well with the artillery nature of the usage of the term combined with the questionable morphology of the machines in question and anglicising the term to 'ballista' is a

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[202] AA, pp. 111, 113, 503, 517, 647, 671, 721, 757, 789, 805, 807, 807, 821, 831, 853.

[203] *Ibid.*, p. 757.

[204] *Ibid.*, pp. 113, 175, 179, 377, 407, 409, 415, 417, 423, 425, 427, 429, 487, 489, 517, 661, 721, 733, 739, 783, 825.

[205] *Ibid.*, pp. 203, 205.

[206] *Ibid.*, pp. 211, 427, 489, 567, 663, 761.

[207] *Ibid.*, p. 121, 299, 357, 489, 515, 775.

very safe approach. It is the use of 'crossbow' that seems most troubling; this interpretation of the word has been shown to be unlikely as the meaning of the word as used by Albert given his regular use of the term to denote artillery. Overall, therefore, Edgington's transltion of artillery terms is normally appropriate but there are several unexplained inconsistencies in her approach to translating both *tormentum* and *mangena*. These deviations are misleading for the reader of her work who is not a Latinist.

RALPH OF CAEN, *GESTA TANCREDI*

As a historian, Ralph of Caen claimed impartiality.[208] His work, though written about Tancred, a leader of the First Crusade and nephew of Bohemond, was not started until after the death of the subject, with the express purpose of avoiding criticisms that Ralph was writing merely to placate and eulogise his lord.[209] This means that the writing of the *Gesta Tancredi* was not begun until late in 1112 at the earliest, the time of the death of Tancred. The work was completed by the year 1118, the year of the death of Arnulf of Chocques, a leading cleric of the First Crusade and later patriarch of Jerusalem, to whom the work was dedicated.[210]

Ralph of Caen came from a well-connected Norman family, as evident from his education by Arnulf of Chocques, an important member of the clergy in Normandy. Through this association with Arnulf of Chocques came Ralph's first, indirect, involvement in the crusading movement when his teacher participated in the First Crusade as chaplain to Duke Robert II of Normandy. Ralph became directly involved in the events in the crusader states with his incorporation into Bohemond's entourage as a chaplain on Bohemond's crusade expedition that

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[208] RC, pp. 603-4.
[209] On Tancred see: J. Riley-Smith, *The First Crusaders*, pp. 70, 101, 133, 213, 223. RC, pp. 603-4; N. Hodgson, 'Reinventing Normans as Crusaders? Ralph of Caen's *Gesta Tancredi*,' in C. P. Lewis, ed., *Anglo Norman Studies XXX: proceedings of the Battle Conference 2007* (Woodbridge, 2008), p. 124.
[210] On Arnulf of Choques see: J. Riley-Smith, *The First Crusaders*, pp. 87, 174, 199-200; I. S. Robinson, *The Papacy, 1073-1198, continuity and innovation* (Cambridge, 1990), pp. 351, 352, 353, 357.

departed Europe in 1107.[211] His attachment to Bohemond lasted until sometime before the death of the Bohemond in 1111, possibly only until the period following Bohemond's defeat at the siege of Durazzo in 1107.[212] It was at this stage of Ralph of Caen's career that he joined the service of Tancred, who was to become the focus of Ralph's account of the events of the First Crusade. The later period of Ralph's life, following the death of Tancred in December 1112, may possibly have seen him as a canon of the cathedral of church in Jerusalem where Arnulf was patriarch.[213] The *Gesta Tancredi* was, most likely, written in Jerusalem.

Ralph's biography leaves no doubt that he had strong connections to a number of the important figures in his narrative. The *Gesta Tancredi* contains much unique information that Ralph of Caen may have obtained through conversations both with Bohemond and Tancred, conversations he mentions in the preface to his *Gesta* as sources for important events in the course of the crusade.[214] Ralph's education and learning is evident in the level of classical knowledge apparent in the *Gesta Tancredi*. Quotations from and allusions to Vergil, Ovid, Horace, Livy, Caesar, Lucan and Sallust contribute to the image of Ralph as a man with a strong awareness of the great classical authors and thinkers.[215] This level of classical familiarity raises the possible problem that, in dealing with artillery and military issues, the *Gesta Tancredi* may, on occasion, be more concerned with displaying classical knowledge and learning rather than depicting exactly what machines or tactics were used in a particular incident. This potential issue is one that must be borne in mind in all dealings with the terminology of any author with Ralph's level of classical learning. Ralph's literary style – his work is interspersed with verse – is such that it has been argued that his narrative was aimed at an elite audience.[216]

References to artillery in Ralph of Caen's work are limited in number but of considerable interest. There are eight uses of artillery terms in Ralph's *Gesta*

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[211] RC, Bachrachs, p. 2; N. Hodgson, 'Reinventing Normans as Crusaders? Ralph of Caen's *Gesta Tancredi*', p. 117.
[212] RC, Bachrachs, p. 3.
[213] *Ibid.*, p. 4.
[214] *Ibid.*, pp. 3-4; RC, p. 603.
[215] RC, Bachrachs, pp. 4-5.
[216] N. Hodgson, 'Reinventing Normans as Crusaders? Ralph of Caen's *Gesta Tancredi*', p. 125.

Tancredi.[217] The most common term referring to artillery is *tormenta*, which accounts for five of the eight references to artillery, the other three references involving the use of the term *fundae*. The clear terminological duality, combined with the consistency of usage – at no point is the same set of machinery referred to by different terms at different points – suggests that Ralph of Caen may have had a clear system of terminology in mind when writing the *Gesta Tancredi*. It is, however, unfortunate for the purposes of this thesis that Ralph's apparently consistent nomenclature is not combined with detailed information on the nature and workings of the machines in question. There are references to *fundae Balearia* in the attack on the towers of Ma'arrat-an-Numan and *tormenta* being used against the walls of 'Arqah.[218] This provides some insight into the function of these machines but little on which to base solid conclusions concerning their typology. The various references to the presence of slings in the workings of some artillery pieces at the sieges of Ma'arrat-an-Numan and Jerusalem perhaps points to the presence of trebuchets, a suggestion backed up clearly at Jerusalem by evidence available in other sources.[219] There is, however, little ancillary information provided about the exact character of the machines used. On the other hand, there is a rather unusual element in the artillery nomenclature of Ralph of Caen: his almost ubiquitous use of the adjective *Balearis* may, perhaps, be important in deciphering his references to artillery. Five of the eight uses of artillery terms involve the term in some fashion and another, a reference to *fundae* at Ma'arrat-an-Numan, is clearly denoting artillery pieces that were earlier described as *fundae Balearia*.[220] Although there are other works that also invoke the term *Balearis* in descriptions of artillery pieces,[221] there is no other source among the major First Crusade narratives that makes use of the term in such a high proportion of the artillery references of the work. A search of the *Patrologia Latina* database of medieval sources reveals

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[217] RC, p. 674 – *fundis balearibus*; *Ibid.*, p. 679 – *fundae*; *Ibid.*, p. 679 – *balearica tormenta*; *Ibid.*, p. 680 – *tormenta*; *Ibid.*, p. 691 – *tormenta*; *Ibid.*, p. 691 – *balearibus scilicet tormentis*; *Ibid.*, p. 692 – *fundae balearibus turbine*; *Ibid.*, p. 692 – *tormento*.

[218] *Ibid.*, pp. 674, 680.

[219] PT, p. 107, AA, pp. 420-2; also see below, 'Siege of Jerusalem: Messenger/Spy thrown toward city', pp. 185-189.

[220] RC, pp. 674, 679.

[221] For discussions of the use of the term *baleari* by other authors in the remit of this thesis see above, 'Guibert of Nogent', pp. 44-44, 'Albert of Aachen', pp. 67-69, and below, '*De Expugnatione Lyxbonensi*', pp. 80-81.

eleven authors, including Ralph of Caen, who use the *Balearis* as an adjective to refer to weaponry of some sort.[222] Many of the uses of the term in the context of weaponry consist of the phrase *Baleari verbera fundae*, which is a quotation from Vergil's *Georgicon*.[223] Among those who use that quotation is Isidore of Seville in his *Etymologiae*.[224] The quotation appears following on from a brief description of the connection between the Balearic Islands and slings and *balistae*, Isidore noting the ascription to Vergil. Given that the connection between those islands and ballistic weaponry is pointed out in two works as important as Vergil's *Georgicon* and Isidore of Seville's *Etymologiae*, it is no surprise that there are several crusader sources written by learned men that showed awareness of the historical connection. It is very difficult to gauge if the use of the adjective *Balearis* has any more significance than an author displaying knowledge of distinguished writers. If it is the case that this term arose from a knowledge of Isidore or Vergil, there is no reason to believe that Ralph of Caen was using this adjective in a technical artillery sense. Neither Vergil nor Isidore of Seville commented on the morphology or workings of the weapons of the Balearic Islands and, if they were the source of the use, there is no reason to think that authors repeating the work later had any more specific knowledge of the workings of 'Balearic' machines.

The translation of these terms in the English edition of the *Gesta Tancredi*, translated by Bernard and David Bachrach, is consistent and systematic. Any phrase used in conjunction with the adjective *Balearis* is translated as 'stone throwers' while when *tormenta* appears on its own it is translated as 'catapults'.[225] Although these terms are generic and not designed to offer a critical examination and shed

[222] Sidonius Appollinaris, *C. S. Apollinaris Sidonii Carmina*, PL, 58; Ennodius Ticinensis, *Opusculum Tertium. Vita beatissimi viri epiphanii episcopi ticinensis ecclesiae*, PL, 63; Isidore of Seville, *Etymologiae*, PL, 82; Arevalus, Faustinus, PL, 82; Rabanus Maurus, *Beati Rabani Mauri Fuldensis Abbatis et Moguntini archiepiscopi de Universo*, PL, 111; Engelmodus, *Episcopi versus ad Radbertum Abbatem*, PL, 120; Ralph of Caen, *Gesta Tancredi*, PL, 155; Guibertus S. Mariae de Novigento, PL, 156 (1853); Albert of Aachen, *Historia Hierosolymitanae*, PL, 166; Guntherus Cisterciensis, Poetae Ligurinus, PL, 212. RC, p. 674 – *fundis balearibus*; *Ibid.*, p. 679 – *balearica tormenta*; *Ibid.*, p. 691 – *balearibus scilicet tormentis*; RC, p. 692 – *fundae balearis*.
[223] Vergil, *Georgicon*, 1, line 309.
[224] Isidore of Seville, *Etymologiarium*, W. Lindsay, ed., 14, vi, lines 47-51.
[225] RC, Bachrachs, pp. 115, 121-2, 123, 139, 141.

light on the typology or morphology of the machinery in question, there is consistency in the majority of the occasions where these phrases are translated. There is, however, an issue with the edition's translation of the phrase *Balearibus scilicet tormentis*, which appears in the course of the siege of Jerusalem.[226] The rendering of this as 'stone throwers and catapults' is questionable.[227] Depicting this as two separate types of machine is likely to be erroneous as there is no reason to see this as anything other than one type of artillery in the same vein as all other artillery references in Ralph's work. There is no conjunction in the text to suggest that *Balearis* and *tormenta* are two separate machines and *Balearis*, as an adjective, would not in any case make sense as such. Consequently, given the system evident in the other translations in the work, this phrase would be best rendered as 'stone throwers'. There is also one passing use of the term *fundae* that does not appear directly in translation in the Bachrachs's edition of the work.[228]

EYE WITNESS LETTERS FROM THE FIRST CRUSADE

The information provided by the major accounts of the First Crusade is supplemented by a number of important letters written during the course of the crusade. These letters were written by eyewitnesses and participants in the events and they are thus important sources for details on the events of the crusade. It must be noted, however, that they provide only patchy accounts of those events and do not allow one to examine patterns in their nomenclature as there are not enough examples of the uses of artillery terminology in these sources. The proximity of the authors to the events described makes these sources mandatory in any consideration of First Crusade issues.

Stephen, count of Blois and Chartres, a participant in the First Crusade until he fled the campaign during the siege of Antioch, wrote a number of letters from the

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[226] RC, p. 691.
[227] RC, Bachrachs, p. 139.
[228] RC, p. 679; RC, Bachrachs, p. 121.

crusade to his wife, Adela in June 1097.[229] Stephen may have briefly held the position of commander-in-chief of the crusader forces on the First Crusade before he fled the campaign although it is also possible that the position to which he was elected was not that of commander-in-chief but rather that he presided or chaired the discussions of the councils of the princes.[230] Following his ignominious departure from the First Crusade, Stephen later travelled East again to take part in the 1101 Crusade.[231] One of his letters contains a description of the attack by Kilij Arslan, the Sultan of Rum, on the crusader forces at the outset of the siege of Nicaea.[232] It is the presence of the word *balistae* in this description that makes Stephen's letter pertinent to this investigation. This phrase is used in such a manner that it is doubtful whether or not it referred to artillery. Although the siege of Nicaea had begun shortly before the engagement in question, this was not in itself a siege action but rather a field battle that occurred near the site of a siege. It is therefore doubtful whether the *balistae* in question could have been artillery, as that would seem to be unsuitable for such an engagement.[233]

There are two extant letters from the pen of Anselm II of Ribemont, castellan of Bouchain and lord of Ostrevant and Valenciennes in the north of France.[234] Written during the siege of Antioch and containing two references to the use of artillery in the later stages of that siege, these letters are important in understanding the extent of the use of artillery at Antioch.[235] Anselm both participated in and died on the crusade during the siege of 'Arqah on approximately 25 February 1099, his death being noted in both the *Gesta Francorum* and Albert of

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[229] J. Riley-Smith, *The First Crusaders*, pp. 14, 64, 87-9, 98, 107, 109-10, 118, 127-8, 138-9, 141-2, 148, 183, 206, 223; J. A. Brundage, 'An errant crusader: Stephen of Blois', *Traditio* 16 (1960), *passim*.

[230] H. Hagenmeyer, *Epistulae et Chartae*, p. 149 – *nam cuncti principes nostri communi consilio totius exercitus me dominum suum atque omnium actuum suorum prouisorem atque gubernatorem, etiam me nolente, usque ad tempus constituerunt*; J. Riley-Smith, *The First Crusaders*, pp. 14, 107, 110; J. A. Brundage, 'An errant crusader: Stephen of Blois', p. 381, 386-7.

[231] J. Riley-Smith, *The First Crusaders*, p. 148.

[232] Entitled *Epistula I Stephani comitis Carnotensis ad Adelam uxorem suam* in Hagenmeyer's collection *Epistulae et Chartae*, pp. 138-40.

[233] See below, 'Siege of Nicaea: Battle against Kilij Arslan', pp. 111-113.

[234] J. Riley-Smith, *The First Crusaders*, pp. 63-5, 74, 122-3, 199, 221.

[235] Anselm of Ribemont, p. 158.

Aachen.[236] He wrote a number of letters from the crusade to Archbishop Manasses II of Rheims.[237] Both his references to artillery come in his second surviving letter to Manasses, concerned with a crusader counter-fortification outside Antioch. He wrote that it was defended by Count Raymond of St Gilles and Toulouse: *comitem S. Aegedii cum ballistariis et sagittariis conlocauerunt*.[238] The second reference to the presence of ballistic machinery is in a similar vein when, soon after that reference, he wrote that *ex illis ballistarii et sagittarii portam custodiebant*.[239] Thus the only artillery references in Anselm of Ribemont's letters are both to the use of *balistae* by the crusading forces. These references fit in well with the chronology of the use of that term in other sources. In many of the narratives sources of the First Crusade there are profuse references to the use of *balistae* in the sieges of Nicaea and Antioch but almost none in the later sieges of Ma'arrat-an-Numan, 'Arqah and Jerusalem. As a result, Anselm's use of the phrase *balistae* cannot be viewed in isolation and is best considered in the context of all the other First Crusade sources.[240]

The letters pertinent to this thesis include that entitled by Hagenmeyer *Epistulae cleri et populi Luccensis ad omnes fideles* in his *Epistulæ et Chartæ*. The descriptions of siege events at Antioch in this letter are preceded by an announcement regarding the sources of the news:

> 'A certain citizen of ours, Bruno by name, known and very dear to all of us, in the year preceding this, went with the ships of the Angles even to Antioch itself. There, as a partner in work and danger, sharer of triumph and joy, be fought along with the fighters, starved with the starving and conquered, also, with the conquering; and when the complete victory had already been achieved, and he had rejoiced three weeks there with all, be returned to us, after a happy voyage. Placing him in our midst, we received from him the pure and simple truth of the matter – lo! in his own account, as follows:...'[241]

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[236] H. Hagenmeyer, *Chronologie*, pp. 218-9; GF, p. 435; AA, pp. 376-8.

[237] J. Riley-Smith, *The First Crusaders*, pp. 73-4.

[238] Anselm of Ribemont, p. 158.

[239] *Ibid.*, p. 158.

[240] See below, 'First Crusade Case Studies: Conclusions – Artillery Typology in the First Crusade', pp. 214-225.

[241] A. C. Krey, *The First Crusade: the accounts of eye-witnesses and participants* (Gloucester, Mass., 1958), p. 161. The Latin is available in H. Hagenmeyer, *Epistulae et Chartae* (Innsbruck, 1901, reprinted New York 1973), pp. 165-6: 'cuius quidam noster, Brunus nomine, cunctis nobis notus, cunctis carissimus, anno

This information, therefore, is direct from the voice of a participant in the siege of Antioch about which it reports. There is only one letter of this type from the people of Lucca regarding the First Crusade. The letter has one possible reference to the use of artillery. This occurs in the course of a description of the construction of a counter-fortification by the crusaders, which was 'a very short ballista-shot away' from Antioch (*iactu ballistae proximum*).[242] This is one of a series of references to the presence of *balistae* at this counter fortification.[243] The letter also provides corroborating evidence for the construction of siege equipment at the siege of Antioch, asserting that the group that arrived by sea after the start of the siege were involved in the construction of 'machines of war':

> hortantur nos, ut ad construendas *belli machinas* copiosam lignorum conferamus materiam; quod factum magnum nobis fuit dispendiumi.[244]

THE LISBON LETTER

This account of the siege of Lisbon exists in numerous forms. What is essentially the same document is extant in six different places. Three letters sent from the siege of Lisbon to different recipients contain various opening formulae while retaining almost identical texts. Furthermore, the account appears in the annals of Cologne and Magdeburg as well as in a fifteenth-century codex housed in the Trier Stadtbibliothek.[245] Of the three letters sent from Lisbon, two are addressed to ecclesiastical figures in Germany: a certain Winand addressed it to Archbishop Arnold of Cologne while Duodechin wrote to Abbot Cuno of Disibodenberg. The

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ante hunc praeterito, cum Anglorum nauibus ad ipsam usque peruenit Antiocham, ubi laboris comes et periculi triiumphe particeps et gaudii, pugnauit cum pugnantibus, esuriit cum esurientibus, uicit quoque cum uicentibus et, post iam peractam ex toto uictoruam, cum omnibus ibi per III septimanas conlaetatus, ad nos felici cursu redit. quem statuentes in medio puram simplicenque rei ueritatem, hac ecce ipsius narratione accepimus:...'

[242] A. C. Krey, *The First Crusade*, p. 161. H. Hagenmeyer, *Epistulae et Chartae*, p. 166.

[243] See below, 'Siege of Antioch: Construction of Mahomerie's Tower, counter-fortification', pp. 146-148 and 'Siege of Antioch: Defence of Mahomerie's Tower against Kerbogha', pp. 153-155.

[244] H. Hagenmeyer, *Epistulae et Chartae*, p. 166.

[245] S. B. Edgington, 'The Lisbon Letter of the Second Crusade', *Historical Research*, 69 (1996), p. 328.

third version of the letter was written by a certain Arnulf to Bishop Milo of Thérouanne, in the north east of France. Edgington has identified the version of Winand to Arnold of Cologne as the earliest.[246] The authors of the other two letters, Duodechin and Arnulf, were also participants in the siege of Lisbon.[247] The patent similarities between the various forms of the letter make it clear that this is one source with numerous copies rather than several different sources. The letter was contemporaneous with the events at Lisbon, as is suggested by its inclusion in the Magdeburg annals, which were only original for the years 1140 to 1148. Thus it was available to the author of those annals no later than 1148, the year after the siege. Also, Arnold, the addressee of Winand's letter, was suspended as archbishop of Cologne in 1148, so it would fit for the letter to have been written to him before that date.

The crusaders included Anglo-Normans, Flemish as well as people from the Rhineland, including a group from Cologne. Winand, as a man of Cologne, presented a version of events from the point of view of the Cologne contingent of the armies present at Lisbon.[248] The other major source for the siege of Lisbon, the *De Expugnatione Lyxbonensi*, discussed below, was written by an Anglo-French priest and, consequently, contains a slightly different perspective on matters regarding the siege.[249]

The terminology of the Lisbon Letter fits well with the German origin of the source. The use of the term *mangene* is a characteristic that has been associated with German sources encountered in the course of this thesis and it is indeed the only term associated with any artillery in the Lisbon Letter. The word is used three times in the course of the description of the events of the siege.[250] The relevent artillery pieces are not described with any significant level of ancillary detail in the

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[246] *Ibid.*, pp. 328-39; S. B. Edgington, 'Albert of Aachen, St Bernard and the Second Crusade', in J. Phillips and M. Hoch, eds., *The Second Crusade, Scope and Consequences* (Manchester and New York, 2001), p. 56.
[247] *Ibid.*, p. 56.
[248] S. B. Edgington, 'The Lisbon Letter of the Second Crusade', p. 335.
[249] See below, '*De Expugnatione Lyxbonensi*', pp. 79-82.
[250] S. B. Edgington, 'The Lisbon Letter of the Second Crusade', p. 338 – *magnellis* and *mangnellis*; *Ibid.*, p. 339 – *magnellis*.

letter except to imply that they were primarily used to attack infantry and that they struck fear and trepidation into those targeted by them.

Edgington's translation of the Lisbon Letter is reliable and consistent in its translation of artillery terms.[251] All three uses of *mangene* are expressed as 'mangonels' in the translation.[252] In addition to being consistent, this seems to be the most appropriate and accurate translation of the term.

DE EXPUGNATIONE LYXBONENSI

The *De Expugnatione Lyxbonensi*, like the 'Lisbon Letter', was written as a letter and provides an account of the capture of Lisbon in 1147.[253] It is untitled in its manuscript form and William Stubbs, who edited a version of it in 1864, provided the title that is now commonly assigned to the work.[254] Stubbs recorded the author as *Osbernus*. Although David also discussed the matter he came to no firm conclusions; he noted the issues and complications and 'hoped that someone more fortunate… will light upon some clue or clues which will lead to a solution of these difficult problems.'[255] Livermore perhaps possessed that desired quantity of fortune as he has since more convincingly ascribed authorship of the work to Raol, an Anglo-French priest and an eyewitness to the events during the 1147 siege of Lisbon.[256] The author provided the initial 'R.' at the outset of his work and this Raol was a prominent priest on the campaign.[257] Raol was close to Hervey de Glanvill –

[251] S. B. Edgington, 'Albert of Aachen, St Bernard and the Second Crusade', pp. 61-7.
[252] *Ibid.*, pp. 64, 65.
[253] H. Livermore, 'The 'Conquest of Lisbon' and its author', *Portuguese Studies*, 6 (1990), p. 2.
[254] J. Phillips, 'Foreword', *De Expugnatione Lyxbonensi*, ed. C. W. David, (New York, 1936, reprinted 2001), fn 2; for William Stubb's edition see Osbernus, *De expugnatione Lyxbonensi*, ed. W. Stubbs, *Chronicles and Memorials of the Reign of Richard*, Rolls series (London, 1864), I.
[255] C. W. David, 'Introduction', *De Expugnatione Lyxbonensi*, ed. C. W. David, pp. 43-5.
[256] H. Livermore, 'The 'Conquest of Lisbon' and its author', *passim*; J. Phillips, 'Foreword', *De Expugnatione Lyxbonensi*, ed. C. W. David, p. xxi.
[257] *De Expugnatione Lyxbonensi*, ed. C. W. David, p. 53.

who is afforded significant attention in the work.[258] Raol carried a reputed piece of the true cross and, amongst other achievements, gave the sermon to the crusaders before their final assault on the city.[259] As it was written by an Anglo-French writer, this account of the siege provides a different slant on events from that provided by the German 'Lisbon Letter'. The *De Expugnatione*, as a letter from the siege, is likely to have been written soon after the events it described with, a date of winter 1147-8 being a distinct possibility.[260] From a military point of view, the author can be seen from his personal observations to have played an active role in the siege. He seems to have been one of only thirty-nine men who spent the first night on land rather than in the ships following the arrival of the crusaders at Lisbon.[261] Elsewhere, Raol wrote of fighting back the crusade's opponents at Lisbon with his own bow.[262] David, in introducing his edition, identifies the author as a 'priest of the virile fighting type that was likely to be attracted by crusading enterprises.'[263]

The artillery terminology evident in this work is largely uncomplicated. There is, for the most part, a single clear main term: *funda*. This is consistently used to depict artillery. The term appears four times in the course of the work and on all but one occasion when it is used it is accompanied by the adjective, *Balearis*.[264] In the exceptional case, the term *funda*, without the adjective *Balearis*, is a reference to the machines of the defenders and occurs in a short passage in which *fundae Balearia* had already appeared. The proximity of the two references, although they referred to distinct machines, may explain why the term *funda* appeared alone at that juncture: there was no need for the adjective when it was clear from the earlier sentence what was meant by *funda*.[265] The defenders' artillery is later referred to

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[258] C. W. David, 'Introduction', *De Expugnatione Lyxbonensi*, ed. C. W. David, p. 42.

[259] H. Livermore, 'The 'Conquest of Lisbon' and its author', *passim*; J. Phillips, 'Foreword', *De Expugnatione Lyxbonensi*, ed. C. W. David, p. xxi.

[260] C. W. David, 'Introduction', *De Expugnatione Lyxbonensi*, ed. C. W. David, pp. 39-40.

[261] *De Expugnatione Lyxbonensi*, ed. C. W. David, p. 96.

[262] H. Livermore, 'The 'Conquest of Lisbon' and its author', p. 4.

[263] C. W. David, 'Introduction', *De Expugnatione Lyxbonensi*, ed. C. W. David, p. 40.

[264] *De Expugnatione Lyxbonensi*, ed. C. W. David, p. 134 – *fundis Balearicis*; Ibid., p. 136 – *fundis*; Ibid., p. 142 – *funde Balearice*; Ibid., p. 162 – *fundis Balearicis*.

[265] Ibid., pp. 134-6.

again as *fundae Balearia*.[266] The uses of this phrase are the only clear-cut reference to artillery in the *De Expugnatione Lyxbonensi* and, as can be seen from the analysis of the case studies, it is likely that this term, with regard to at least one instance of its use, refers to traction trebuchets.[267] These machines are consistently depicted as stone throwers and seem to have been of a considerable size, given that at one point the *De Expugnatione* tells of crews of one hundred men each operating them.[268]

In addition there are two uses of *balista*-related words in the *De Expugnatione*.[269] As with any use of the term *balista* there is a question about the best interpretation of the word: it is debatable whether it is best seen as an indication of the presence of crossbows or artillery pieces. The two uses of the word in this work are somewhat ambiguous but, on balance, seem to be references to crossbows rather than artillery pieces. On both occasions the term is used in conjunction with reference to arrows or archers and there is a sense in one of the references that both *balistae* and *archiferis* were firing the same missiles as one another: *sagittae*.[270] Accordingly and in the absence of any evidence or turn of phrase giving a hint of an artillery nature, it would be sensible to treat these references as allusions to crossbows and not artillery pieces.

The translation of the key term in the main translation of this work, the parallel-text edition of Charles Wendell David, is very consistent although not as accurate as it might have been. *Fundae Balearia* is regularly expressed as 'Balearic mangonels.' The 'Balearic' element of the translation is the only viable term, the wisdom of translating *fundae* as 'mangonels' rather than a more literal translation of 'slings', is questionable. With regard to the translation of *balistae* and related words, the translation is faultless and shows an awareness of the nature and context of the use of the word. The footnotes contain commentary on the form of the word

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[266] *Ibid.*, p. 162.
[267] *Ibid.*, p. 142; also see below, 'Siege of Lisbon: Organisation and Effect of Artillery Crews', pp. 305-306.
[268] *De Expugnatione Lyxbonensi*, ed. C. W. David, p. 142; also see below, 'Siege of Lisbon: Organisation and Effect of Artillery Crews', pp. 305-306.
[269] *De Expugnatione Lyxbonensi*, ed. C. W. David, p. 124 – *balistarum*; p. 160 – *baliste*.
[270] *Ibid.*, p. 160.

and whether it refers to the weaponry itself, its operators or the missiles propelled by those weapons.

WILLIAM OF TYRE, *HISTORIA RERUM IN PARTIBUS TRANSMARINIS GESTATUM*

William of Tyre, as well as being the author of one of the more important chronicles of crusade events in the Levant, was archbishop of Tyre from 1175. Knowledge of William's life was greatly augmented by the discovery by Huygens in the mid twentieth century of a previously lost autobiographical chapter of the *Historia*.[271] William's involvement in the affairs of the crusader states was enhanced by his position as chancellor of the kingdom of Jerusalem, a post that he held from 1174 until his death or close to it.[272] He was thus extremely well placed to collect information on the course of events in the crusader states in the later years of the twelfth century. William received a thorough education in a number of European centres of learning over the course of almost twenty years of study. His schooling took him to Paris, Orleans and Bologna. Between Paris and Orleans he studied theology as well the liberal arts for of ten years. At Bologna he was instructed in legal studies.[273] This education manifested itself in a strong classicising tendency in his Latin style. Authors from antiquity who prominently influenced his writing include Livy, Cicero, Sallust, Virgil and Ovid.[274] There were also many Christian authors whose work impacted on that of William of Tyre: Augustine of Hippo, Benedict of Nursia and Gregory the Great, Jerome, Orosius,

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[271] R. B. C. Huygens, 'Guillaume de Tyr étudiant: un chapître (XIX, 12) de son Histoire retrouvé,' *Latomus* 21 (1962), pp. 811–829.

[272] The exact details of the final years of William's life are unclear; for a full discussion of the matter, see P. W. Edbury and J. G. Rowe, *William of Tyre, Historian of the Latin East* (Cambridge, 1988) pp. 20-2.

[273] P. W. Edbury and J. G. Rowe, *William of Tyre, Historian of the Latin East*, p. 15 and n. 10. Our information on William's education comes from an autobiographical section in his own work: WT, pp. 879-81.

[274] P. W. Edbury and J. G. Rowe, *William of Tyre, Historian of the Latin East*, p. 33.

Prudentius, Sulpicius Severu, Boethius, Cassidorus and Einhard can be seen to have affected his thought and writing in various ways.[275]

The *Historia rerum in partibus transmarinis gestatum* begins with the background to the First Crusade. As well as describing the course of crusade history long before his lifetime, William's expansive account covers events far past the chronological confines of this thesis, describing incidents as late as the year 1184. The exact date that William started writing is unclear but it is evident that from 1167 onwards the *Historia* becomes much more detailed.[276] This has been presumed to be an indication that at this point William at least started to keep more detailed notes of events with history writing in mind even if he did not actually embark on writing his *Historia* at this point.[277] The work seems to have been started at some point between 1167 and 1170.[278] The work ends with an account of events that took place in 1184. William of Tyre appears to have died at some point between that date and 1186.[279]

For the purposes of this thesis, William of Tyre's account is most useful for the years following the end of the First Crusade. For the First Crusade, William was largely reliant on the works of Fulcher of Chartres, Albert of Aachen, Raymond d'Aguilers, Baldric of Dol and the *Gesta Francorum*.[280] His version of events during that campaign have only been included in the following case studies where they differ significantly from his source materials. In the cases where William's account closely follows that of his sources, the appropriate section of William's work has been referenced but not quoted. Even though William does not become an

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[275] *Ibid.*, pp. 32-43; C. Kostick, 'William of Tyre, Livy, and the Vocabulary of Class', *Journal of History of Ideas* 65, 3 (2004), pp. 353-68.

[276] *Ibid.*, p. 353.

[277] P. W. Edbury and J. G. Rowe, *William of Tyre, Historian of the Latin East*, p. 26.

[278] *Ibid.*, p. 26.

[279] There is some debate about the exact date of William's death, for a full discussion of the matter, see *Ibid.*, pp. 20-2.

[280] For William's reliance on other works for his First Crusade information see: *Ibid.*, pp. 45-6; P. Knoch, 'Albert von Aachen und Wilhelm von Tyrus' *Studien zu Albert von Aachen*, pp. 29-63 and 'Exkurs Tabellarischer Textvergleich der Kreuzzugsdarstellungen Alberts von Aachen und Wilhelms von Tyrus', *Ibid.*, pp. 152-211.

independent source until after the information provided by Fulcher of Chartres in his *Historia Hierosolymitana* ends in the mid 1120s, his account has been more fully incorporated into the case studies at the outset of the second case studies chapter, that beginning in late 1099. For the period from the fall of Jerusalem until the ending of Fulcher's *Historia* with events in the year 1124 – that is, for the majority of the years that William of Tyre's account and the period covered by this investigation intersect – William was heavily reliant on the work of Fulcher of Chartres.[281] Albert of Aachen, as has been noted, is of the First Crusade chroniclers, the most imformative on the subject of artillery but William of Tyre made use of his *Historia* only until the fall of Jerusalem in 1099.[282] There is no evidence that he used the later years of Albert's account, which continues until 1119.[283] William did not slavishly copy from his sources, however, and can be seen at certain junctures to have added his own knowledge to that available in his literary sources.[284] William cannot be said to have been entirely reliant on these written works and had some recourse to eyewitness testimony at various points of his work.[285] These occasions were necessarily less applicable to the earlier years of the crusading movement, since William, writing in the last few decades of the twelfth century would have had access to few who had observed events at the end of the eleventh century or early in the twelfth century. There are indications, however, that his oral sources cover events as far back as the 1087 battle of Dorylaeum.[286] The *Historia* of William of Tyre can, therefore, be seen to have utilised a great deal of different sources and its author was talented at synthesising these disparate sources without mindless imitation.

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[281] P. W. Edbury and J. G. Rowe, *William of Tyre, Historian of the Latin East*, pp. 45-6.

[282] *Ibid.*, pp. 45-6, n. 4.

[283] This is one of the situations that lends to the possibility that Albert of Aachen wrote his *Historia* in two sections, initially only writing up to the fall of Jerusalem and later continuing the work onwards (See AA, pp. xxiv-xxv and above, 'Albert of Aachen', pp. 58-59). If this were the case, it would appear that William of Tyre only had access to the earlier section of the work, which covered up to the 1099 fall of Jerusalem.

[284] P. W. Edbury and J. G. Rowe, *William of Tyre, Historian of the Latin East*, p. 48.

[285] *Ibid.*, p. 50.

[286] *Ibid.*, p. 52.

Before considering the treatment of artillery in William of Tyre's *Historia*, the significance of the chronological chasm separating the author from much of what he wrote must be taken into account. This separation shows itself when William appears to apply – without evidence – military tactics, techniques or technologies that were not employed on the occasion he describes. A prime example of this is the description in the *Historia* of the final assault on Jerusalem in 1099. William maintains the essence of the descriptions of events available from the contemporary works and preserves the fact that entry to the city came about as a result of an assault from the top of siege-towers. What he adds, however, is the presence of a purpose built bridge at the summit of one of those siege-towers to allow for access to the walls:

> Hi, quoniam praesidium civitatis in vicino constitutum erat, ex parte plurima se in arcem contulerunt; at vero exercitus pontem libere et sine difficultate super murum aptantes, et scalas applicantes moenibus, certatim in urbem nemine obstante ingressi sunt.[287]

There is no evidence in any of the sources from the late eleventh or early twelfth century that a purpose built and preplanned *pons* was employed to gain access to the walls of Jerusalem. Rather it seems that the attackers reached the wall with a more *ad hoc* method, possibly by use of a beam pushed across as a makeshift bridge or perhaps by climbing directly from the siege-tower onto the walls. The intimation in William's work that the crusaders employed anything more than a temporary, makeshift bridge when crossing from the siege-tower to the walls is not backed up by the sources written closer to the event – none of them refer to a *pons*. The account of Raymond d'Aguilers comes closest to mentioning a bridge when it describes the use of part of the defences of the siege-tower, a *cratis*, to gain access to Jerusalem but this should be seen as an *ad hoc* use of part of the siege-tower to take advantage of a moment of weakness in the city's defences and not as an indication that the First Crusade armies incorporated any type of purpose built bridge into the siege-tower.[288] William's account, therefore, must be viewed as flawed in regard to the detail he provides on military matters in this instance. The recognition of even one such occurrence in the course of William of Tyre's work is cause for concern as it raises the possibility of similar cases at other junctures. The main anxiety that this presents is that such a repetition would occur at some point in

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[287] WT, p. 409.
[288] Rd'A, p. 344.

the significant section of the William of Tyre's work for which he is the main source of information for the modern historian but during which he was not an eyewitness or even in the vicinity of the events described. If there were such a case in that period where there is no suitable corroborating or contradictory source with which to compare it, there would be no means by which to identify the interpolation. The siege and capture of Ascalon in 1153 provides another instance in which the military evidence of William of Tyre must be regarded as suspect. During that siege, he contends that a single rock thrown by a crusader artillery piece crushed a *trabem ingentis magnitudinis* as well as the forty men carrying it.[289] Causing the death of forty men with a single rock would, presumably, have called for a rock of proportions beyond the throwing capabilities of medieval artillery. This undoubted exaggeration regarding the effects of artillery must be borne in mind when assessing the stated effects of artillery in his account.

The use of the term *balistae* in the work is more consistent with the western European application of the term than its crusading usage. There is a pattern according to which crusade narratives tend to use the word more often in an artillery context than in reference to 'crossbows', whereas contemporary writers recording events in Europe seem more likely to take the opposite approach.[290] William of Tyre is a departure from this pattern as, in his work, the use of the term *balistae* usually appears to be in reference to crossbows, despite the crusading context of his work. It might be postulated that this is an effect of his western European education except that many of the writers of crusade narratives were educated in Europe and, indeed, many of the most important writers composed their works in Europe having never been on crusade. The word appears on thirteen occasions in William's narrative.[291] A clear example of the use of the term as an indication of the presence of crossbows and certainly not of artillery appears during William's description of the 1097 battle against Kerbogha outside Antioch during the First Crusade. In this

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[289] *Ibid.*, pp. 801-2. On the 1153 siege of Ascalon see: S. Runciman, *A History of the Crusades*, II (Harmondsworth, 1971), pp. 338-40; C. Tyerman, *God's War, a new history of the crusades* (London, 2006) pp. 344, 346.

[290] See above, 'Gesta Francorum', pp. 19-20; 'Raymond d'Aguilers', pp. 47-47; 'Albert of Aachen', pp. 65-69; 'Robert the Monk', pp. 28-30. Also see below, pp. 93-104.

[291] WT, pp. 206, 335, 401, 403, 406, 531, 593, 597, 764, 780, 794, 1035.

incident William depicts foot soldiers walking ahead of the cavalry forces armed with *balistae* as well as bows: *Sed et nostri pedites qui arcubus utebantur et balistis, equitum precedentes manipulos.*[292] The use of these weapons by soldiers in the course of a battle rather than a siege is an important indicator that these were not artillery pieces but it is the fact that they are depicted as being moved forward by those foot soldiers ahead of the cavalry that is crucial. Large artillery pieces would have been a cumbersome obstruction ahead of the cavalry and would have hindered the vital charge of those troops had they been placed in the path of the riders.[293] Thus these can only have been small weapons operated by individuals and are likely to have been in the form of crossbows. Additionally, William's account of Saladin's 1182 siege of Beirut makes it clear that the author did not view *balistae* as large siege weapons. In the course of his description of the siege he noted that Saladin did not possess any siege engines: *Machinas tamen seu iaculatorias, seu alterius generis, quibus solent ab hostibus expugnari praesidia, nullas secum detulerat.*[294] Rather, the attacker's plan was to use a sudden attack and, when that did not succeed, he turned to undermining. Those miners were protected in their work by soldiers using *balistae*:

> ut ipsi liberius huic studio operam possent impendere, alii, ut praemisimus, arcubus instabant et *balistis*, et infinita telorum immissione; et tanta instabant protervia, quod vix sine mortis periculo, qui intus erant, digitum audebant exerere.[295]

That Saladin's troops could use *balistae* to protect the miners while at the same time not possessing siege engines strongly indicates that William did not consider *balistae* as large siege engines. This is borne out by a particular example of William's editing of his source material for the siege of Antioch. His *Historia* reproduces Albert of Aachen's account of the crusader assaults on the *Waiferii* gate in a faithful manner, certainly as regards Albert's detailed account of events.[296] In the course of that incident, however, Albert recorded the use of *balistae* by the defenders of Antioch. Albert's use of the term *balistae* has been shown above to

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[292] *Ibid.*, p. 335.

[293] For a discussion of the importance of the cavalry charge and mobility in medieval warfare see J. France, *Western Warfare in the Age of the Crusades*, pp. 157-61.

[294] WT, p. 1035.

[295] *Ibid.*

[296] AA, p. 202-4; also see below, 'Siege of Antioch: Battle at *Waiferii* Gate', pp. 138-142.

have equated with artillery rather than crossbows.[297] William, in his version of the events at that gate, retained the reference to artillery but changed the terminology. In place of *balistae* he referred to the use of a *machina iaculatoria* writing that:

> *Cives autem videntes machinam muro proximam, illuc sub omni celeritate contendunt; et directis ad machinam jaculatoriis iterum tormentis, crebra molarium contorsione eam debilitare festinant.*[298]

It appears from this that William was not comfortable with the application of *balistae* as a term to depict artillery and changed the terminology from his source material accordingly. Overall, the treatment of *balistae* in William's work contains occasional instances where there is no doubt that the use of the term referred to small weaponry. There are several other occasions where the use is somewhat ambiguous but there are no occasions where the nature of its use points to an artillery definition as the most likely of the possible definitions. It may be concluded that *balistae* does not occur as an artillery term in the work of William of Tyre.

Throughout his remarkably lengthy work, William of Tyre freqently had reason to refer to the use of artillery and utilised a wide range of terms to do so. In the twenty-three-book history, thirty-five chapters include reference to artillery usage. The most common term amongst all these references is *machina*, a term that was used in various forms. The term is often qualified by a subsidiary term such as *iactulatorius*. Another general term used by William of Tyre, but less frequently, is *iaculatoria instrumenta*.[299] Finally, as regards the more generic terms, the adjective *iactulatorius* appears independently on two occasions.[300] These terms say little on their own about the machines they represent but the non-specific character of so large a portion of William of Tyre's artillery references speaks volumes for his nomenclature. It suggests that, although William of Tyre often wished to convey that artillery was present and used at certain events, he was not concerned with communicating the specifics of artillery typology.

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[297] See above, pp. 65-69; also see below, 'Siege of Nicaea: Alternative Siege Tactics Applied to Nicaea', pp. 130-131.
[298] WT, p. 255.
[299] *Ibid.*, p. 836;
[300] *Ibid.*, pp. 202, 255.

There is a regular use of the term *tormenta* in William's work. For the most part the use of this term does little to set it apart from the terms used elsewhere in the work. There is one occasion, however, where *tormenta* is clearly used as a general term for artillery. During his account of the siege of Jerusalem, William refers to *minoribus tormentis, quae mangana vocantur*.[301] The clear indication here is that the *tormenta* are the general type of machine of which the *mangane* are a particular and small variety. Despite this being an isolated incident that contains positive evidence depicting *tormenta* as a generic term, the use of *tormenta* in other parts of William's narrative does not negate the possibility that the term was used consistently as a general term. There are three occasions in which *tormenta* appears alongside the adjective *bellica*.[302] It is worth noting that all three of these occasions occur in books nineteen and twenty of William's *Historia*. This is not a phrase that William spread throughout his work.

William of Tyre's use of the term *mangane* is interesting. He himself was not of German origin but that term is one that has a strong Teutonic connection and it features strongly in Germanic works such as that of Albert of Aachen and the anonymous 'Lisbon Letter.'[303] William's application of the term can largely be explained by his use of Albert of Aachen's *Historia Ierosolimitana* as a source when writing the First Crusade sections of his longer history. The word appears only on isolated occasions in the course of William's writing and was used a total of three times.[304] Furthermore, on each of these occasions the term is accompanied with a reference to another type of artillery. The first such example appears in William's account of the siege of Nicaea: *itemque jaculatorias, quas vulgari appellatione mangana dicunt*.[305] This reoccurs twice during William's description of the 1099 siege of Jerusalem. The first instance refers to *mangana vel petrarias vocant*[306] while the other includes the phrase *minoribus tormentis, quae mangana*

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[301] *Ibid.*, p. 403.
[302] *Ibid.*, pp. 877, 927, 929.
[303] See above, 'Albert of Aachen', pp. 57-70 and 'The Lisbon Letter', pp. 77-79. For a discussion, of the impact of Western European Terminology on the artillery nomenclature employed by the crusaders see below, 'Western European Artillery Terminology in the Eleventh and Early Twelfth Centuries', pp. 93-104.
[304] WT, pp. 202, 393, 403.
[305] *Ibid.*, p. 202.
[306] *Ibid.*, p. 393.

vocantur.[307] This final use of the term is interesting in that the *mangana* are identified as small (*minores*) *tormenta*. It is unclear if this is intended to convey that these were small artillery pieces of an entirely different typology to the others employed by the crusaders or machines of a similar type but on a smaller scale. Given the lack of detail in the instance where this line appears it is impossible to identify the exact typology of the machines in question. It is telling that all references to *mangana* in William's *Historia* occur during his account of the First Crusade, the period of his work for which he made use of Albert's account. There would appear, therefore, to be a direct correlation between the appearance of the term in William's work and his use of Albert's narrative. This explains why a non-Germanic work utilised a term with strong connections to a German nomenclature. It is also note worthy that, while Albert applied the term with the spelling *mangena*, William corrected it to the arguably more proper spelling, *mangana*.[308] Other than spelling, there is no qualitative difference between the terms and the use of one rather than the other seems to be entirely dependent on scribal preference. William's use of qualifying terms alongside the term *mangana* on each of the three occasions in which it appears in his narrative may suggest that William of Tyre was not entirely familiar with the term or slightly uncomfortable with its use, perhaps thinking that it was not a term understood sufficiently widely to accurately convey the detail he wished.

William of Tyre's use of *petraria*, a term that appears on three occasions in this work, is intriguing.[309] The word never appears as a term for artillery without another term to clarify its nature. Instead, whenever it appears it is clarified by terms such as *machina iaculatoria*. Such is the case during William's account of the 1140 siege of Banyas where he mentions the presence of *machinis iaculatoriis, quas petrarias vocant.*[310] This is typical of the use of the term in William's *Historia*. The manner in which on each of the three occasions on which the term is used in the work William saw the need to clarify the term with a very general term depicting the nature of the *petraria* is revealing. There is a sense here that William

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[307] *Ibid.*, p. 403.
[308] C. DuCange, *Glossarium mediae et infimae Latinitatis*, II col. 427. The main term referenced is *mangana* whereas *mangena* is listed as a possible derivative.
[309] WT, pp. 202, 393, 686.
[310] *Ibid.*, p. 686.

of Tyre felt that without the inclusion of the phrase *machina iaculatoria*, his readership would not have been able to identify correctly the artillery nature of the *petraria*. The term *petraria* has appeared in three of the works already examined and discussed here: Fulcher of Chartres, Peter Tudebode and Raymond d'Aguilers. William of Tyre, however, is the only author who exhibits such a clear need to clarify its use.[311] It is possible that a significant shift occurred in the understanding of this particular artillery term between the early years of the twelfth century and when William wrote in the latter years of that same century. Conversely, it is possible that no such change occurred in the general understanding of the term and that rather it was specifically William's own level of knowledge of artillery nomenclature that was lacking. Indeed, this would fit with his copying of Albert of Aachen's use of *mangana* when it was not a term than he felt confident enough to use independently in the later parts of his *Historia*.

A lack of strong knowledge of artillery terminology would also tally with the manner in which he often opted to draw on extremely generic and non-specific terms such as *machina iaculatoria* and *instrumenta iaculatoria*. Furthermore, William's apparent willingness to change his terminology based, presumably, on changes in his source material, does not suggest a desire to investigate and identify the exact nature of the artillery that was used in the events he described. He showed himself amenable to repeating Albert of Aachen's terminology, as exhibited by his use of *mangana*, during his account of the First Crusade but he did not use this term later on. Similarly, the phrase *tormenta bellica* appears on three occasions toward the end of the work but not earlier. This alteration of terminology patterns may reflect a change in the sources of information used by William, which would leave him further exposed to the possibility that he accepted uncritically the terms given him for artillery and made no attempt to consolidate this information into a consistent system of nomenclature. This is hardly surprising in an account written by a scholar with many preoccupations other than the nature of crusade artillery but it is, nonetheless, unfortunate for the purposes of this thesis. It is thus the ancillary details provided by William regarding artillery that must be prioritised rather than

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[311] PT, p. 107, also see above, 'Peter Tudebode', pp. 23-23; Rd'A, pp. 200, 339, 342, also see above, 'Raymond d'Aguilers', pp. 47-49; FC, pp. 186, 221, 295, 401, 402, also see above, 'Fulcher of Chartres', pp. 55-56.

his overall terminology, which does not reveal much. These ancillary details will be teased out in the case studies section.

The most accessible translation of William of Tyre's work is that of Babcock and Krey entitled *A History of Deeds Done Beyond the Sea*.[312] Their treatment of artillery terms in that edition is often noncommittal. The translation of the term *mangana*, for example, sees the appearance in the English text of the italicised word '*mangon*' rather than any detailed attempt to contend with the possible information that could have been gleaned from William's choice of terms.[313] A similar approach is repeated with the term *petrariae*.[314] On other occasions terms that are clearly associated with artillery are rendered with non-specific terms for military equipment. In their translation of William's account detailing Nureddin's siege of Banyas, for example, the phrase *machinae et tormenta bellica* is expressed as 'machines and engines of war.'[315] There can be no qualms with the translation of *machinae* as 'machines' but rendering *tormenta bellica* as 'engines of war' is to entirely ignore the artillery specific nature of the term *tormentum*.[316] Overall, much like the approach taken by William of Tyre himself to artillery terminology, the Babcock and Krey translation does little to show a special interest in these terms and, as a result, the translations are often vague.

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[312] William of Tyre, *A History of Deeds Done Beyond the Sea*, eds. Emily Atwater Babcock and A.C. Krey, 2 vols (New York, 1943).
[313] WT, Babcock & Krey, I, p. 158, 351, 362.
[314] *Ibid.*, I, pp. 158, 351; *Ibid.*, II, 108, 337.
[315] WT, p. 877; WT, Babcock & Krey, II, p. 309.
[316] The translation of *tormenta bellica* as 'engines of war' is one that is repeated in the Babcock and Krey translation of William of Tyre: WT, p. 929, WT, Babcock & Krey, II, p. 365. There is a similar instance where *tormenta bellica* is rendered as 'machines of war': WT, p. 927, WT, Babcock & Krey, II, p. 361.

WESTERN EUROPEAN ARTILLERY TERMINOLOGY IN THE ELEVENTH AND EARLY TWELFTH CENTURIES

The commentators on the First Crusade came from many different backgrounds and regions throughout Europe. The nature of Europe at this time was such that, although there was a common religious culture among different peoples, there were significant differences between individual regions which are expressed in the terminology of Latin works produced in those regions. As a result, discrete patterns of artillery terminology may have developed in the lexicons of the military classes of those regions. Were there to be a significantly different nomenclature in, for example, the south of Italy from that of the north of France there would be implications for the nature of the terminology of the *Gesta Francorum* when compared with that of Fulcher of Chartres' work. As a result, to understand properly the terminology of the disparate sources for the crusades, it will be necessary to identify differences that may exist in artillery terminology between various regions of Europe. To achieve this, narratives from three regions, southern Italy, northern France and Germany, will be examined to identify variations in artillery nomenclature. It should also be noted at this point that there is a possibility of classical contamination that is equal across the various regions of Europe and, as a result, is likely to have been a shared influence on many of the western sources being examined below.

A search for these regional differences is not without problems. The nature of warfare in western Europe in this period is inherently divergent from that which developed in the course of the crusades. Variations in the standards of defences as well as in army size and resources means that warfare in Europe, though endemic,

took place at a far lower scale than that of the crusades, especially the First Crusade.[1] Thus the frequency of artillery references in European sources cannot be expected to be on a par with the myriad of references that appear in the First Crusade narratives. This is reflected, for example, by the works of the most detailed historian of the early eleventh century, Ralph Glaber, the *Historiarvm libri qvinqve* and the *Vita domni Willelmi abbatis*, which have no references to artillery.[2] Similarly, from from the latter years of the era covered by this thesis Otto of Freising's *Chronica, sive Historia de duabus civitatibus* in the later 1140s contains only one reference to artillery and neither the *Gesta regum Anglorum* nor the *Historia Novella* of William of Malmesbury – a key author of the 1120s – contain any artillery references that are not directly dependent on the crusade works that are the main focus of this section.[3] William's *Gesta regum Anglorum* does, however, contain three certain references to artillery in his account of events in the crusades – in these he used the term *balista* once and *petraria* twice – but these references are dependent on the work of Fulcher of Chartres.[4] As those references were reliant on information returned from the crusades, however, they cannot be taken as representative of any European system of artillery terminology.

Both the ubiquitous *Gesta Francorum* and Ralph of Caen's *Gesta Tancredi* had roots in southern Italy. The author of the *Gesta Francorum* was clearly initially part of Bohemond of Taranto's contingent on the march of the First Crusade whereas Ralph of Caen spent much of his life and career attached to Tancred,

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[1] For a discussion of the scale of medieval warfare see: B. Bachrach, 'Crusader logistics: from victory at Nicaea to resupply at Dorylaion', in J. Pryor, ed., *Logistics of Warfare in the Age of the Crusades*, pp. 46-50; H. Delbrück, *History of the Art of War within the Framework of Political History: The Middle Ages*, W. J Renfroe Jr., ed., 3 vols. (English translation, London, 1982); J. France, *Victory in the East*, pp. 122-42; J. F. Verbruggen, *The art of warfare in western Europe during the Middle Ages*, pp. 5-9.
[2] Rodulfus Glaber, *Historiarvm libri qvinqve, The five books of the Histories, Vita domni Willelmi abbatis, The life of St William*, ed. J. France, (Oxford, 1989).
[3] Otto of Freising, *Chronica, sive Historia de duabus civitatibus*, A. Hofmeister, ed., *Monumenta Germaniae Historica, Scriptores rerum Germanicarum in usum scholarum separatim editi* (Hannover, 1912), p. 218; also see below, pp. 104-106.
[4] William of Malmesbury, *Gesta regum Anglorum*, I, eds. R. A. B. Mynors, R. M. Thomson & M. Winterbottom, (Oxford, 1998), pp. 634, 676; William of Malmesbury, *Gesta regum Anglorum*, II, eds. R. M. Thomson & M. Winterbottom, 'Commentary', pp. 318, 338.

Norman First Crusade prince and later prince of Antioch, as well as to Arnulf of Choques, patriarch of Jerusalem from 1112 to 1118. Thus Ralph of Caen probably had a more complex connection to regions of western Europe, always tied to Norman areas but having influences from both Normandy and southern Italy. The nature of artillery terminology in northern France and Normandy will be discussed presently but first the nomenclature of southern Italy will be examined. As in the case of artillery terminology in the *Gesta Francorum*, southern Italian sources of the period are short of references to the use of artillery. For the purposes of military history, the two main sources for southern Italian Normans are the *Gesta Roberti Wiscardi* by William of Apulia and Geoffrey Malaterra's *De rebus gestis Rogerii Calabriae et Siciliae Comitis et Roberti Guiscardi Ducis fratris eius*.[5] Internal textual evidence relating to William of Apulia's references to the First Crusade places the writing of his work between 1095 and 1099.[6] This date means that, crucially, William of Apulia was a part of the same cultural milieu as that from which the southern Italian author of the vital *Gesta Francorum* emerged. William had some classical learning and quotations from many classical authors have been identified in his work but, at the same time, the *Gesta Roberti Wiscardi* has many traits in common with the *Chansons de Gestes*.[7] Geoffrey Malaterra's *De rebus gestis Rogerii Calabriae et Siciliae Comitis et Roberti Guiscardi Ducis fratris eius* finishes in 1099 and as the author makes no mention of the death of the major subject of the work, Count Roger, it is likely that the writing of the work terminated before the death of the count on 22 June 1101.[8]

One element of the treatment of artillery in these two works that can immediately be seen to tally with the treatment in the *Gesta Francorum* is their sparse references to artillery pieces. The limited supply of references is clearly

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[5] William of Apulia, *Gesta Roberti Wiscardi*, ed. M. Mathieu, (Palermo 1961). Geoffrey Malaterra, *De rebus gestis Rogerii Calabriae et Siciliae Comitis et Roberti Guiscardi Ducis fratris eius*, ed. E. Pontieri, *Rerum Italicorum Scriptores, Raccolta Degli Storici Italiani dal cinquecento al millecinquecento*, V (Bologna, 1928).

[6] William of Apulia, *Gesta Roberti Wiscardi*, ed. M. Mathieu, 'Introduction,' p. 13.

[7] *Ibid.*, pp. 59, 65.

[8] Geoffrey Malaterra, *De rebus gestis Rogerii Calabriae et Siciliae Comitis et Roberti Guiscardi Ducis fratris eius*, ed. E. Pontieri, *Rerum Italicorum Scriptores, Raccolta Degli Storici Italiani dal cinquecento al millecinquecento*, V, Preface, p. viii.

evident in William of Apulia's work. The *Gesta Roberti Wiscardi* is a work that stretches to over seventeen thousand words dealing mainly with the Norman conquest of southern Italy and, yet, it contains only five references to artillery together with one other reference to siege engines.[9] The five references to artillery encompass only two terms, *petraria* and *tormentum*, with *petraria* being slightly more common with three usages to the two of *tormentum*. During his description of the siege of Bari (1086-71), William of Apulia wrote that Robert Guiscard and his forces:

> turrim fabricat, quae lignea muris
> Prominet; ac iuxta de quaque *petraria* parte
> Ponitur, adiuncto muros quo evertere possit
> Diversi generis *tormento*.[10]

This short section of the *Gesta Roberti Wiscardi* includes two of William's references to artillery. It is clear in this instance that the siege-tower (*turris*) was the focal point of the assault and that the artillery pieces, both the *petraria* as well as the *diversi generis tormento*, were used in supporting roles. There is a clear sense in this instance of the presence of several types of artillery pieces being used and, perhaps more importantly, an indication that William of Apulia was aware of the necessity to differentiate between the various artillery pieces, which he identified with the phrase *diversi generis tormento*, and another particular type of artillery that was denoted by *petraria*. In this incident, it appears that *tormentum* was used as a general description indicating artillery but not one particular type, whereas *petraria* was used in a more specific manner to denote a certain kind of artillery piece. Unfortunately the dearth of ancillary detail means that an identification of these various types of machines is impossible from this incident alone. Shortly after that description William of Apulia, still writing about the long siege of Bari, reported that *diversaque machina muris additur, eversis ut moenibus urbis apertae Normannis aditus pateat.*[11] Though there is no definite indication here to confirm that the *machina* mentioned was an artillery piece, that is likely to have been the

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[9] William of Apulia, *Gesta Roberti Wiscardi*, book 2, line 500, p. 158 – *petraria*; *Ibid.*, line 502, p. 158 – *tormento*; *Ibid.*, book 3, line 451, p. 188 – *petraria*; *Ibid.*, book 4, line 250, p. 218 – *petraria*; *Ibid.*, line 540, p. 232 – *tormentis*. *Ibid.*, book 2, line 517, p. 160 – *machina*.
[10] *Ibid.*, book 2, lines 499-502, p. 158.
[11] *Ibid.*, book 2, lines 517-19, p. 160.

case given the proximity of the line to the earlier mention of both *petraria* and *tormenta*.

The terminology employed in Geoffrey Malaterra's work is such that it is difficult to draw any conclusions from it. References to artillery are ambigious at best and, although there are frequent uses of the term *machinamenta* in siege operations, Malaterra rarely elaborated on the nature of siege equipment. There is a single reference to the presence of *arietes* at the siege of Bari alongside *machinamenta* but such clarity in military terminology is a rarity in the *De Rebus Gestis Rogerii*.[12] There is another reference, which also appears during Geoffrey Malaterra's account of the important siege of Bari, where he reported that *lapides funda versus hostes supra muros iacendo*.[13] Although *funda* is a term used to describe artillery in a number of crusade narratives, it is used in a different manner by Malaterra.[14] Rather than depicting artillery, *funda* was used here to denote a weapon utilised by one man, Amerinus, who was sneaking out of the city. Wishing to appear to be a member of Robert Guiscard's attacking forces he threw rocks back at the city with a *funda*. Thus it is clear that this was not a large siege machine throwing rocks either at the walls or at Bari's defenders; rather, it was a sling operated by one man while on the move and, as such, is not an example of artillery use. The most common term utilised by Malaterra to denote siege engines was *machinamenta*, which appears frequently throughout the work.[15] The detail supplied alongside a number of those references is such that they could be interpreted as referring to artillery. One such case appears during an account of a siege of Byzantine forces who were defending a *castrum* in 1041:

> Sed et ipsa castra, ipsis intra reclusis, exercitu vallantes oppugnabant, machinamentisque, quibus doctissimi artifices erant, ad id officii agendum necessariis aptatis, muros et turres crebris ictibus

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[12] Geoffrey Malaterra, *De Rebus Gestis Rogerii*, p. 49.

[13] *Ibid.*

[14] GF, p. 182; PT, pp. 23, 107; BD, p. 27; GN, p. 146; RM, pp. 757, 775; FC, pp. 221, 296; RC, pp. 674, 679, 692; *De Expugnatione Lyxbonensi*, ed. C. W. David, pp. 134, 136, 142, 162.

[15] Geoffrey Malaterra, *De Rebus Gestis Rogerii*, p. 13 - *machinamentisque*; *Ibid.*, p. 15 – *machinamenta*; *Ibid.*, p. 23 – *machinamentis*; *Ibid.*, p. 38 – *machinamentis*; *Ibid.*, p. 49 – *machinamenta*; *Ibid.*, p. 53 – *machinamenta*; *Ibid.*, p. 75 - *machinamenta*; *Ibid.*, p. 87 – *machinamentis*; *Ibid.*, p. 91 – *machinamentis*; *Ibid.*, p. 92 – *machinamentis*; *Ibid.*, p. 106 – *machinamenta*; *Ibid.*, p. 106 – *machinamenta*.

impingendo, funditus diruebant: ruptisque muris, aditis patentibus, irrumpentes, omnia sibi diripiebant.[16]

The description of the *machinamenta* here is a possible depiction of artillery. The crucial element is the reference to *ictus*, which indicates that the machines brought about 'strikes' or 'blows' against the walls and towers. However, though these *ictus* may have been the striking of the walls by stones thrown by artillery pieces, they could just as likely have been the blows landed by a battering ram or similar siege engine. As a result, this can only be flagged as a possible artillery reference without being definitively identified as such.

More common in the *De Rebus Gestis Rogerii* are descriptions such as this, also from the siege of Bari: *arietes facere, caeteraque machinamenta, quae usui capiendae urbis necessaria erant.*[17] This case lacks any details about the exact nature of the engines, except to say that they were necessary for capturing the city. There is a chance that these *machinamenta* included or were exclusively artillery but there is no solid evidence either for or against that possibility. The nature of these references is problematic, however, the lack of a use of a specific artillery term and the vague nature of the descriptions mean that these examples are of limited use when analysing the nomenclature of Geoffrey Malaterra. In general, there is not enough information in the work of Geoffrey Malaterra to observe a 'system' of artillery terminology: instead there are merely a debatable number of isolated artillery references spread out through the work.

Given the lack of identifiable patterns of artillery terminology in the *Gesta Francorum*, Geoffrey Malaterra's *De Rebus Gestis Rogerii* and, to a lesser extent, William of Apulia's *Gesta Roberti Wiscardi*, there is no evidence that any of the terms applied to artillery in the *Gesta Francorum* were used as a result of a pre-existing system of terminology that originated in the region of southern Italy. This lack of a pattern notwithstanding, there is one element of the manner in which these sources deal with artillery that was shared by all of them: the relegation of artillery to a secondary role.

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[16] *Ibid.*, p. 13.
[17] *Ibid.*, p. 49.

Ralph of Caen, likewise, was an author who initially came from a southern Italian background. His artillery nomenclature, as has been pointed out earlier, has a mixed nomenclature that makes use of a variety of terms in a number of diverse combinations. For example, the adjective *Balearis* appears both alongside *fundae* as well as *tormenta*. It is immediately evident that Ralph of Caen's terminology is significantly more complex than that of the south of Italy in the second half of the eleventh century. It thus seems unlikely that a strong influence was exerted on his nomenclature by the systems of Italy, as there are no such intricate systems evident in Italy in this period.

In common with that of southern Italy, the terminology in the sources of northern France is also marked by a paucity of references. This pattern is borne out in the works of Orderic Vitalis and William of Poitiers, as well as that of the earlier case of Ralph Glaber, as was noted above. Orderic Vitalis, though born in Shrewsbury and thus English by birth, was educated in Normandy and resident in the Abbey of Saint-Évroul. As a result, if there were such a thing as a northern French artillery nomenclature, he is likely to have been influenced by it. It cannot go unnoticed, however, that Orderic had a classically affected style, which may also have had an impact on his writing about military affairs.[18] The exact dates between which his famous *Historia Ecclesiastica* was written are unclear but it has been deduced that work on book three had certainly started by 1114.[19] This is, therefore, a work that comes in the shadow of the successes of the First Crusade and is somewhat influenced by works which gave accounts on the events of the crusade. Any comparisons between Orderic's work and those of the First Crusade must take account of the fact that Orderic was certainly aware of Baldric of Dol's work and that he made use of it in his writing of the section of his *Historia Ecclesiastica* dealing with the First Crusade.[20] Given that Orderic was aware of and used

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[18] Orderic Vitalis, *The Ecclesiastical History*, ed. M. Chibnall, (Oxford, 1968-80), I, pp. 17-19.
[19] *Ibid.*, I, p. 31.
[20] *Ibid.*, V, p. 138; the similarity between the two accounts in this instance is evident in the following side-by-side comparision:

Baldric's work in the course of describing at least one incident in which artillery was involved, it cannot be ruled out that Baldric's account may also have tainted Orderic's wider artillery nomenclature. Even with that cautionary note, however, it is the case that any discussion of the northern French sources of this period cannot be deemed complete without treating Orderic's *Historia*.

The *Historia Ecclesiastica* is vast but, despite containing over 350,000 words, it makes very few references to artillery or siege warfare. Orderic had understandably many other concerns in his mind when writing besides providing vivid descriptions of siege engines. That is not to assert that this work is without a clear artillery nomenclature. The *Historia* makes seven references to *balistae*.[21] There is, however, a certain ambiguity about the nature of these references. In the crusade narratives there is a regular, though not a provably universal, depiction of *balistae* as artillery pieces.[22] Orderic Vitalis's work, on the other hand, contains several examples of the clear use of the word *balistae* to depict either crossbows or some other kind of bow operated by a single soldier.[23] There are other occasions on which the use of the term is such that it could be either a crossbow or an artillery piece, as well as one case where the term is used to depict artillery use.[24] A number of these more debatable references come from the sections of Orderic's work that recount the events of the crusade, for which Orderic was reliant on the crusade narratives for his work. It is the other references, therefore, that must prioritised in the search for a French artillery dialect and these are such that, for the most part, describe crossbows rather than artillery pieces.

Baldric of Dol, p. 85:	Orderic Vitalis, V, p. 138:
phalanges armatae circumvallabant moenia, *balistarii* et sagittarii spicula dirigebant, et qui in arce lignea erant, lapides immensos sursum jactitabant.	phalanges armatae circumuallabant moenia, balistarii et sagitarii dirigibant spicula, et qui in arce erant lignea. insum saxa iactitabant ingentia.

[21] Orderic Vitalis, *The Ecclesiastical History*, II, p. 172; III, p. 306; V, pp. 138, 242, 254; VI, pp. 76, 212.
[22] See below, 'First Crusade Case Studies: Conclusions – Artillery Typology in the First Crusade', pp. 214-225.
[23] Orderic Vitalis, *The Ecclesiastical History*, II, p. 172; VI, pp. 76, 212-4.
[24] *Ibid.*, III, p. 306; V, pp. 138, 242 254.

William of Poitiers's *Gesta Guillelmi II ducis Normannorum*, an account of the career of William 'the Conqueror', first in his role as duke of Normandy and later as king of England, is another source steeped in the milieu of northern French terminology.[25] This *Gesta* was written in the 1070s but has a limited number of artillery references from which to identify the northern French nomenclature.[26] The description of the defences of Mayenne during a 1063 siege asserts that battering rams, a *tormentum* or other instruments of war would have had no effect on the castle due to its strong defensive location.[27] There is no indication in this case that artillery was actually employed in the siege. The manner in which this reference to a *tormentum* appears would seem to indicate that the use of artillery was a common method in the siege craft of warfare in Normandy in this period. Thus it might be the case that such use was more widespread than William of Poitiers's meagre recording of their use suggests but that does not aid in the search for the local artillery dialect.

William of Poitiers's work also includes a single reference to the use of *balistae*.[28] In a similar manner to the *balistae* references in Orderic Vitalis's *Historia Ecclesiastica*, this incident differs in a crucial manner from the form in which *balistae* appear in the First Crusade narratives. Without a doubt William uses the term to refer to weapons operated by a single man in a battle formation, most likely a crossbow. The single appearance of the term in the *Gesta Guillelmi II ducis Normannorum* does not indicate the presence of artillery pieces. This is shown by the manner in which the weapon's use is described: the men operating the *balistae* were described as *pedites* and were reported by William to have been positioned at the front of William the Conqueror's army at the Battle of Hastings (1066). Their use with *sagittae* by foot soldiers (*pedites*) in a battle scenario rather than a siege makes this an unambiguous case in which *balista* should be interpreted as crossbow rather than as an artillery piece.

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[25] William of Poitiers, *Gesta Guillelmi*, eds. R.H.C. Davis and M. Chibnall, (Oxford, 1998).
[26] *Ibid.*, p. xx.
[27] *Ibid.*, p. 66.
[28] *Ibid.*, p. 126.

The works of both Orderic Vitalis and William of Poitiers, therefore, suggest that the term *balistae*, when used in northern France, more commonly referred to crossbows than it did to artillery pieces. This has also been identified by Turnbull as discernable in Henry of Livonia's thirteenth-century *Chronica* which described events in the Baltic Crusades.[29] This is in stark contrast to the nomenclature of the narratives of the First Crusade where an interpretation of the term as depicting artillery pieces is more often correct. If, therefore, one accepts the evidence that *balistae* in their classical sense were used in the course of the First Crusade, there is a clear contrast to Europe, or at least northern France, in the late eleventh and early twelfth centuries. This may account for the opinion among historians that the term *balista* may best be rendered as 'crossbow' or that, at very least, it be treated as a problematic term that must be viewed with caution.[30] That may be true with regard to much of the military practice of western Europe in the Central Middle Ages but, as can be seen from this thesis, it cannot be said about the crusades. There cannot be said to have been a neat distinction between histories of Europe and those of the crusades, however, as Otto of Freising's account of the reign of Frederick Barbarossa used the term *balista* to refer to artillery whereas William of Tyre's account of events in the crusader principalities seems to use in reference to crossbows.[31]

Many of the authors of the First Crusade accounts discussed above had ties to the region of northern France. Robert the Monk, Fulcher of Chartres, Peter Tudebode, Guibert of Nogent and Baldric of Dol all came from the wider region of northern France as did the eyewitness letter writers Stephen of Blois and Anselm of Ribemont. This was, therefore, the primary region for providing the narrators of the First Crusade and, as a result, it would be very beneficial to identify any regional dialect that may have influenced the artillery terminology of those narrators.

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[29] S. Turnbull, 'Crossbows or Catapults? The Identification of Siege Weaponry and Techniques in the Chronicle of Henry of Livonia,' in A. V. Murray, ed., *The Clash of Cultures on the Medieval Baltic Frontier, passim*.

[30] J. Bradbury, *The Medieval Siege*, pp. 250-1; R. Rogers, *Latin Siege Warfare in the Twelfth Century*, pp. 256-7; S. Turnbull, 'Crossbows or Catapults? The Identification of Siege Weaponry and Techniques in the Chronicle of Henry of Livonia,' in A. V. Murray, ed., *The Clash of Cultures on the Medieval Baltic Frontier*, pp. 307-20.

[31] See below, p. 105 and above, 'William of Tyre', pp. 86-88.

Consequently, it is particularly unfortunate that the major sources that emerged from this region in the period of the crusade do not place much emphasis on artillery descriptions. That being the case, there is no identifiable regional nomenclature to provide a possible influence on the crusade narratives of this area.

Raymond d'Aguilers, on the other hand, came from the south of France, a region culturally as well as geographically distinct from the north. This region provides an additional problem to those associated with the regions discussed above as the south of France in this period was without the kind of excellent historical works that Orderic Vitalis provided for northern France or William of Apulia provided for southern Italy. Historical information for this area does not necessarily come from sources written in the region and, as such, there is little potential to identify a regional dialect for artillery.[32]

Albert of Aachen was, as has been noted, a source that stood apart from the majority of the First Crusade narratives in its complete independence from the virtually omnipresent influence of the *Gesta Francorum*.[33] Being based in Lotharingia, Albert was also geographically independent of the other major sources for the crusade. Thus his terminology must be examined with an eye to any possible distinct German or Lotharingian nomenclature that may have influenced his choice of terminology. There is one particular phrase by an eleventh-century German author that is of special relevance in identifying a possible German nomenclature. That phrase comes in Berthold of Reichenau's chronicle, a continuation of Hermann of Reichenau's work, which refers to *machinamentis balisticis quae mangones teutonizant*.[34] This precise assertion, exactly the sort of desirable evidence absent from the Italian and French sources, maintains that there was a type

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[32] See, for example, the endnotes in chapter 1 of John H. and Laurita L. Hill, *Raymond IV, count of Toulouse* (Paris, 1969) where a variety of sources are used to illuminate the history of Raymond in the period before the First Crusade. These sources include many references to crusade narratives but the main non-crusading text is the work of William of Malmesbury, an early twelfth century English historian.

[33] See above, 'Albert of Aachen', pp. 57-59.

[34] Berthold of Reichenau, *Chronicon*, ed. I.S. Robinson, *Die Chroniken Bertholds von Reichenau und Bernolds von Konstanz, Monumenta Germaniae Historica, Scriptores rerum germanicarum, nova series*, 14, p. 360.

of *machinamenta balistica* or 'balistic machine' that the Germans, specifically, called *mangones*. Not only does this provide a fascinating insight into the language of the time, it also fits exactly with the most striking difference between the nomenclature of Albert of Aachen and that of his French and Italian fellows. Albert of Aachen is the only early First Crusade narrator to refer to the use of *mangene* in the course of the First Crusade.[35] The connection between this term and Germanic writers is furthered by its appearance in the 'Lisbon Letter' chronicling the siege of Lisbon in 1147.[36] That letter was written by a member of the contingent from Cologne who, like Albert, was very reliant on the term *mangena* to depict artillery.[37] Berthold of Reichenau does not, however, make other references to artillery and very few references to the use of machines in any capacity in siege warfare. Thus, apart from that one very direct and important statement about German terminology, Berthold provides little insight into any possible Germanic artillery nomenclature.

An examination of Otto of Freising, an important German author from the mid-twelfth century, further demonstrates this Germanic system of artillery terminology. The almost complete absence of artillery references in Otto's *Chronica, sive Historia de duabus civitatibus*, a 'universal' history covering from the Creation until 1146, has already been noted.[38] That lengthy work contains only one reference to the use of artillery, a reference that employed the term *tormenta* and is connected to no ancillary detail from which to derive an idea of the typology or effectiveness of the machines in question.[39] Otto's other work, the *Gesta Frederici* – of whose four books Otto wrote two and Rahewin, Otto's continuator, wrote two – is more replete with mentions of artillery. It contains nine definite references to artillery as well as a further five possible references.[40] Most of these

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[35] He does so with remarkable frequency; see above, 'Albert of Aachen', pp. 59-65 and below, 'Appendix: Albert of Aachen's Artillery Nomenclature', pp. 325-343.
[36] See above, 'The 'Lisbon Letter'', pp. 77-79.
[37] *Ibid.*, pp. 338, 338, 339.
[38] See above, p. 94.
[39] Otto of Freising, *Chronica*, p. 218.
[40] Otto of Freising, *Gesta Frederici I imperatoris in Lombardia auctore cive Mediolanensi*, Oswald Holder-Egger, ed., *Monumenta Germaniae Historica SS. rer. Germ.* (Hanover, 1892), pp. 48, 123, 124, 125, 126, 128, 131, 143.

artillery refences occur during Otto's account of the 1155 siege of Tortona.[41] Seven of the definite references to artillery use the term *tormentum*, one of which was accompanied by the adjective *Baleare*.[42] The use of both the terms *tormentum* and *Baleare* fit with the high level of classical influence evident in Otto's writing.[43] For the purposes of this chapter, however, the most important artillery reference involves the term *mangana* but in the unfamiliar form *manga*: *Lapidem vi tormenti ex balista, quam modo mangam vulgo dicere solent, propulsum ad superiora meniorum loca conscendisse.*[44] This passage dovetails well with Berthold's use of the term *mangena* by identifying the term as one used by 'the common people' (*vulgus*). Although not marking it out as a specifically German term in the manner in which Berthold did, Otto clearly marked *manga* (*mangana*) out as a common term and it could be argued that, as Otto was German, the common parlance with which he would be most familiar would be that of people from the German kingdom. Furthermore, Otto's use of the term provides another example of the use of that term in the context of a German narrative parallel the references by Berthold, Albert of Aachen and the 'Lisbon Letter'.

The manner in which Otto used the term *balista* is also revealing, for although he twice used the term in an ambigious manner that cannot be definitively identified either as an artillery or a crossbow reference, in this key instance he used the term to refer distinctly to a stone-throwing artillery piece.[45] Given that the machine in question threw stones, however, it should be noted that it was unlikely to be an artillery piece in the late classical and Vegetian sense, having a morphology similar to that of a large crossbow. The references to the nature of the term *mangena* in Berthold and, to a lesser extent, Otto's works combined with the nomenclature evident in the 'Lisbon Letter' and the work of Albert of Aachen, provide significant evidence to allow the identification of the term *mangena* as part of a specifically German approach to artillery terminology.

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[41] For Otto's account of the siege of Tortona (1155) see *ibid.*, pp. 122-131. For a description of the poliorcetics involved in the siege of Tortona see R. Rogers, *Latin Siege warfare in the Twelfth Century*, pp. 134-5.

[42] Otto of Freising, *Gesta Frederici*, pp. 48, 123, 124, 126, 128, 131.

[43] C. C. Mierow, 'Bishop Otto of Freising: Historian and Man', *Transactions and Proceedings of the American Philological Association* 80 (1949), p. 397.

[44] Otto of Freising, *Gesta Frederici*, p. 124.

[45] *Ibid.*, pp. 123, 124.

SECTION 2:

CASE STUDIES

NICAEA TO JERUSALEM:
FIRST CRUSADE CASE STUDIES

SIEGE OF NICAEA (1097)[1]

The siege of Nicaea began on 6 May 1097, when the first groups of crusaders arrived outside the walls.[2] The siege was characterised by a failure of the crusader attempts to gain entry to the city, which eventually surrendered on 19 June 1097 having been brought to its knees as a result of the blockade of the lake to the west by boats provided by the Byzantines.[3]

CONSTRUCTION OF EQUIPMENT BY THE CRUSADERS ON ASCENSION DAY

Gesta Francorum, p. 179:	Robert the Monk, p. 756:	Guibert of Nogent, p. 145:
In die autem Ascensionis Domini coepimus urbem circumquaque inuadere, et aedificare *instrumenta lignorum* atque turres ligneas, quo possemus murales turres sternere.	Die siquidem Ascensionis Domini Nicaeam urbem obsidione vallaverunt et *balistis et arietes et cetera id genus instrumenta*, quibus inhabitantes expugnari quirent	Dominicae ergo die Ascensionis cepere pro muris urbem undecumque pervadere et machinas instruere, phalas erigere, instaurare phalaricas, murorum ac turrium giros

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[1] T. Asbridge, *The First Crusade: A New History* (London, 2004), pp. 118-31; J. Bradbury, *The Medieval Siege*, pp. 108-9; P. E. Chevedden, 'The Invention of the Counterweight Trebuchet', pp. 76-86; J. France, *Victory in the East*, pp. 160-5; H. E. Mayer, *The Crusades*, J. Gillingham, trans., (Oxford, 1988), pp. 46-7; J. Riley-Smith, *The Crusades: A History* (London, 2005), p. 35; R. Rogers, *Latin Siege Warfare in the Twelfth Century*, pp. 16-25; S. Runciman, *A History of the Crusades*, I, pp. 175-81; C. Tyerman, *God's War*, p. 124.

[2] H. Hagenmayer, *Chronologie*, p. 70.

[3] *Ibid.*, p. 79.

apposuerunt.	frequentibus per ambitum pulsare *balistis*.

The arrival of the crusader army at Nicaea was staggered; it would appear that those who arrived first and established a partial blockade of the city, leaving the southern gate and the lake on the city's western side unobstructed, immediately started to set up siege equipment on their arrival but before that of other elements of the army. As the last of these elements, the southern French group, arrived but before they had fully established themselves in their camp, there was an attack by Kilij Arslan's relieving force. This battle is an important event in the sources and, as it separates the two stages of building in the camp, allows for an explicit distinction between the first and second stages of contruction of equipment.[4] Here we have an account from the *Gesta Francorum* and two associated narratives, those of Robert the Monk and Guibert of Nogent, giving information on the construction before the battle.

A distinct variation can be seen here in the terminology applied to what is clearly the same set of machines. It is also worth noting that this is one of the occasions where Peter Tudebode's account is almost exactly the same as that of the *Gesta Francorum* apart from some grammatical changes; thus it is not included here among the other evidence.[5] What is more noteworthy is that Robert the Monk's account differs significantly in the machines described. The *Gesta Francorum* wrote that *instrumenta lignorum* were built at this stage. Robert the Monk, on the other hand, despite his source being heavily dependent on the *Gesta* for its structure and much of its information, expanded on this and wrote not only that *cetera id genus instrumenta* were built at Nicaea on Ascension Day (14 May, 1097) but also that *balistis et arietes* were constructed. There is an obvious similiarity between the mention of *instrumenta lignorum* in the *Gesta* and Robert the Monk's *cetera id genus instrumenta*. The term *instrumenta* is very general in its application and tells us little about the exact machines built at this time. Indeed, it is quite possible that the reason for Robert the Monk's expansion on the term was his realisation that this general term gave little information to the reader coupled with a

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[4] AA, pp. 106-8; GF, pp. 181-2; FC, p. 181-2; GN, pp. 145-6; Rd'A, p. 20; PT, pp. 22-3; RM, p. 756; BD, pp. 26-7; RC, p. 617.
[5] PT, p. 22.

desire to be more enlightening than the work from which he was drawing. The term *instrumenta* was a coverall term for siege machines; this is important because, though the two accounts use different terminology to describe the machines contructed at this time, they are not contradictory accounts.[6] Though by using the phrase *instrumenta lignorum*, the *Gesta Francorum* did not explicitly mention *balistae et arietes* as Robert the Monk did, the use of the phrase does not preclude these machines from what was being constructed in the crusaders' camp. Both *balistae* and *arietes* could be described as *instrumenta*.

The question that remains is whether or not, in this assessment, Robert the Monk's account can be taken as a factual representation of the situation on Ascension Day 1097. His account is more detailed in this instance than that of the *Gesta Francorum* but his basis for this extra detail has not been ascertained. Robert's account is an interesting case in the examination of artillery terminology; but his references to artillery are difficult to pin down. In this case his account provides information that does not tally with the course of the siege of Nicaea. His mention of the construction of an *arietes* is problematic as there is no place in the other narratives of the siege that mention the use of such a machine in the assaults on the city although they do mention their construction.[7] The resulting doubt over the references to *arietes* must also be placed over his mention of *balistae*. There is more evidence for the presence of *balistae* at the siege than there is for *arietes* but the point still remains that, in this instance, Robert does not show himself to be an entirely reliable source and, thus, this section of his narrative cannot be used to prove conclusively that *balistae* were constructed at this exact moment of the chronology of the siege. It is clear from the later evidence, however, that *balistae* were constructed at some point in the siege. As well as appearing again in Robert's own narrative of the siege, their presence at Nicaea was attested by Albert of Aachen, the *Gesta Francorum* and, possibly, Stephen of Blois.[8]

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[6] See below section 'First Crusade Case Studies: Conclusions – General Terms', pp. 226-227.

[7] AA, pp. 110-2; FC, pp. 186-7; also see below, 'Siege of Nicaea: Construction of Equipment and Attacks on the City following the Battle', pp. 114-8.

[8] RM, p. 757; also see below, 'Siege of Nicaea: Heads Thrown into the City', pp. 119-124. AA, p. 120; also see below, 'Siege of Nicaea: Alternative Siege Tactics Applied to Nicaea', pp. 130-133. GF, p. 183; also see below, 'Siege of Nicaea:

Stephen of Blois, Letter, p. 139:

> [Stephen wrote that Suliman attacked the Christian forces surrounding Nicaea with a great force.]

> De nostris omnibus nemo tunc periit, sed postea noster communis magnus exercitus multos acerrimosque congressus exercens cum *ballistis* et arcubus multos ex Turcis et maioribus interfecit.

This is a unique reference in the course of the First Crusade to *balistae* being used in the context of a battle rather than in the context of a siege. Stephen of Blois was writing to Adela, his wife, and, though he was decribing an event that occurred during the siege of Nicaea, it was not a siege operation that was being described but rather a battle between the besieging forces and a relieving force led by Kilij Arslan. In fact, Stephen's account is inaccurate in stating that *Solimannus* attacked the crusaders, since it was Kilij Arslan, the son of *Solimannus*, who attacked the crusaders at Nicaea. *Solimannus* himself had been killed in 1085.[9]

This source differs from the major sources for the First Crusade. Stephen of Blois was not writing a complete narrative account of the crusade, but a personal letter home to his wife. Only one of Stephen's other letters is extant. Partially as a result of there being so few surviving letters from Stephen, the evidence available from this author on military matters is very limited. Consequently, there is no room for the kind detailed analysis of the terminology that is possible with the multitude of examples that are available from authors such as Albert of Aachen. In Stephen's letters this is the one reference to anything that might possibly be artillery. As discussed earlier, the term *balista* is one of the more contentious terms that was or might have been applied to artillery as it is debatable whether or not classical artillery forms survived into the Middle Ages; when analysing the use of the term there is the danger of confusion when deciding whether it is best understood as the

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Missile Protection for Underminers', pp. 125-129. Stephen of Blois, p. 139; also see below, 'Siege of Nicaea: Battle against Kilij Arslan', pp. 111-113.
[9] J. France, *Victory in the East*, p. 156.

classical artillery type or as a crossbow.[10] This, therefore, is a single reference in isolation without a larger system of nomenclature. Stephen of Blois' social status was also inherently different to that of the other authors who wrote accounts of the First Crusade; unlike the anonymous author of the *Gesta Francorum*, who was possibly a knight on the First Crusade, Stephen of Blois was a member of the military elite, a crusading prince.[11] But it must also be taken into account that he is unlikely to have written this letter himself. Rather is should be assumed that a chaplain or some sort of cleric wrote it for him. As a result, it would be presumptious to see this as definite evidence of the nomenclature of the upper echelons of the First Crusade.

The application of the term *balista* in the course of the battle outside the walls of Nicaea rather than in the course of siege operations leads to a tentative indication that, in this case, the best translation of the term is as 'crossbow' rather than the classical artillery type. This use in what was clearly a battle rather than a siege suggests an item that had more manoeuvrability than would have been possible for a large artillery machine. The battle, however, took place next to the crusader camp when Kilij Arslan's forces attacked the southern French as they established their camp toward the south of the city. According to the *Gesta Francorum* this took place after the establishment of siege equipment had started. Stephen of Blois, being from northern France, was not in the contingent of the Provencals who were attacked just as they were making camp so it is possible that his contingent, and thus the part of the battle about which he was best informed, was already using their siege equipment against the city. The proximity of the battle to the camp means that the possibility that artillery had been set up for the siege and turned toward the battle cannot be ruled out. Regarding the manner in which the machines in question were used, the application of the *balistae* in an entirely anti-personnel manner in this event does not, on its own, confirm them as crossbows: the nature of the engagement means that there were no other targets available for the army and their missile troops (both those using the *balistae* and those using *arcus*). Overall, therefore, the items being described by Stephen of Blois in this battle are

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[10] See above, 'Introduction', pp. 8-10.
[11] See above, '*Gesta Francorum*', pp. 15-19.

most likely to have been crossbows but on the strength of this single reference it is very difficult to make that case with certainty.

The reference says that the army killed many Turks *ballistis et arcubus*. The reference here is clearly to two different types of weapon. Despite the pairing of the two terms in the source, there does not, on this occasion, seem to be much reason to read anything into their apposition; although this is not always necessarily the case.[12] The other evidence discussed surrounding the context of this reference is more relevant to the identification of the typology of the equipment involved here than the word order of the source.

CONSTRUCTION OF EQUIPMENT AND ATTACKS ON THE CITY FOLLOWING THE BATTLE[13]

Raymond d'Aguilers, p. 21:	Fulcher of Chartres, pp. 186-7:	Albert of Aachen, pp. 110-2:
post hoc *machinae* extruuntur, atque murus impetitur, sed hoc erat frustra, nam murus e contra, firmissimus erat et viriliter sagittis et *machinis* defendebatur.	tunc heroes nostri fecerunt *machinas* fieri, *arietes*, scrofas, turres ligneas, *petrarias*. distendebantur arcubus sagittae, *tormentis* iaculabantur lapides, hostes nostri nobis nosque illis vicem certaminis pro posse reddabamus.[14] saepe armati cum *machinis* nostris urbem adsiliebamus, sed muro forti nobis obstante cassabatur adsultus. saepe	Dum in decreto firmissimo obsidionis et destructionis urbis curricula septem ebdomadarum ibidem circa euis menia uersarentur, et principes alii *iactus et tormenta lapidum* ad minuendos muros et turres aptarent, alii arietes ferratos componerent, et diuersa ingenia quererent... Dum plurimorum principim *strues et machine* muro

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[12] See below, 'Siege of Nicaea: Missile Protection for Underminers', p. 125-129.

[13] William of Tyre includes this event in his account incorporating mention of artillery (*itemque iaculatorias, quas vulgari appellatione Mangana dicunt et petrarias*) but has no original information to offer; WT, p. 202.

[14] The word *tormentis* does not appear in the first redaction of Fulcher of Chartres' work, rather the start of that sentence reads *distendebantur arcubus sagittae, jaciebantur lapides*, FC Patrologia, col. 835; for a discussion of the changes in artillery terminology between the two redactions of Fulcher's *Historia Hierosolymitana* see above, 'Fulcher of Chartres', pp. 54-55.

de Turcis, saepe de Francis vel sagittis vel lapidibus percussi interibant.	Nicee applicarentur, et quedam non in uanum, quedam frustra laborarent, Heinricus de Asca, Hartmannus comes unus de maioribus Alemannie, *vulpem* ex proprio sumptu quercinis trabibus composuerunt.

The events described here encompass both the second phase of the construction of siege engines as well as their application in the siege of Nicaea. As described above, there are two separate points in the various crusade narratives where the building of siege equipment is mentioned; this is the second of the two.[15] The three accounts for this incident offer a number of different lists for what was constructed. Raymond d'Aguilers' account is the most basic; he merely notes that *machinae extruuntur* ('machines were erected') and that their attack on the walls was frustrated by the *machinae* of the defenders.[16] The term *machinae* is a very general one and does not shed any notable light on the equipment constructed. Rather it is the terminology in the accounts of Albert of Aachen and Fulcher of Chartres that is more revealing. They both give more detailed information than Raymond d'Aguilers regarding what was built; Fulcher's list of *arietes, scrofas, turres ligneae, petrariae* is more specific but not far removed from Albert's mention of *iactus et tormenta lapidum* as well as his statement that *arietes ferratos componerent, et diuersa ingenia*. The battering rams are common to both; in the extracts above, the *scrofae* and *turres ligneas* appear only in the work of Fulcher of Chartres but the *scrofa* was likely some kind of portable shelter under which the wall could be approached. This seems to be the case with the *vulpes* mentioned towards the end of the extract from Albert of Aachen and it would appear that Fulcher of Chartres' more abbreviated account simply joined what were two events in the narrative of Albert of Aachen into one in his own account of events. Thus only the *turres ligneas* remain to be matched to a reference in Albert of Aachen and could be seen to be included in Albert's *diuersa ingenia*, a phrase used to indicate

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[15] See above, 'Siege of Nicaea: Construction of Equipment by the Crusaders on Ascension Day', p. 108-110.

[16] See below, 'Siege of Nicaea: Defenders' Artillery', p. 117-119.

any number of different pieces of siege equipment, including siege-towers. There is, however, no evidence of siege-towers being used in the course of the siege of Nicaea and so this reference by Fulcher must be treated with care. Albert and Fulcher are in agreement that artillery pieces were constructed at this point, the artillery pieces that were built were described by Fulcher as *petraria* and by Albert as *tormenta*. Therefore, the two major accounts that inform on this construction of siege engines are broadly in agreement about what was built. Their dealing with artillery, however, has a marked difference regarding terminology.

The two more detailed sources are clearly in tandem as regarding what they were generally describing as being built by the crusaders at Nicaea. This makes their difference over artillery terminology all the more interesting. Albert of Aachen has a very clear preferred term for artillery pieces, *mangena*; thus, this use of the expression *tormenta* is a deviation from the norm of that source but not an unusual one.[17] Fulcher of Chartres' references are sparser than those of Albert of Aachen and lack a reliance on a single term in the same manner. That is not to say, however, that there is no clear structure to Fulcher's application of artillery terms. Fulcher of Chartres' *Historia Hierosolymitana* shows a clear pattern in artillery terms. In the first redaction of the work Fulcher used *petrariae* – the term found here describing the machines constructed – with regularity but that term does not appear in any further instances in the expanded second redaction. Instead, the reviewed and lengthened work used the term *tormenta* to depict the use of artillery. The use of *tormenta* in Fulcher's account of this event is a later addition to the work.[18] This part of the *Historia Hierosolymitana* is crucial for understanding Fulcher's approach to artillery terminology. The manner in which he reviewed this part of the work and saw fit to change the wording in the 1120s while maintaining what appears, on the surface at least, to be a contradiction in terms is revealing. There are two possible conclusions that could be drawn from this. What appears to be an inconsistency might not have been so to Fulcher, which would suggest that

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[17] See above, section on 'Albert of Aachen', pp. 59-65. AA used the term *mangena* thirty-eight times and the term *tormentum* seventeen times, thus it is not his usual term but it was one used frequently. For a full list of Albert of Aachen's artillery terminology see below, 'Appendix: Albert of Aachen's Artillery Nomenclature', pp. 325-343.

[18] See above, 'Fulcher of Chartres', pp. 55-56.

one or both of the terms was a general term for artillery or, on the other hand, that Fulcher was not concerned about a contradiction and that being specific and technical with regards to artillery terminology was not an element of his work in which Fulcher took much interest. Given the overall use of terminology in the work, it is the latter of these two possibilities that is more convincing as the apparently arbitrary use of two distinct terms in each redaction points to Fulcher not having much interest in specific terminology. It seems unlikely that there was a complete change in artillery typology between the first and second redactions and even if there was, it still would not fully explain the two contrasting terms being applied in this part of the siege of Nicaea.

What can be taken from this event is the presence of stone throwing engines. The appearance of the term *petrariae* in Fulcher's work, even if it cannot be said to have been a specific technical term for a certain type of machine, has connotations with the projection of stone missiles that are confirmed in the following sentence, which, in the second redaction at least, described artillery pieces throwing rocks. Albert of Aachen too described a similar role for artillery in this incident when he alluded to *iactus et tormenta lapidum*. As a result, it is clear that the artillery pieces being directly described in this section were stone-throwers and not bolt-throwing engines.

The effectiveness of these stone throwing engines was less than impressive. Albert of Aachen's account tells that *strues et machine* were applied to the walls of Nicaea and were not aiding the crusaders enough in their attempts to induce the fall of the city so a *vulpes* was constructed in an attempt to approach the siege in a different manner. The necessity of adopting a fresh approach indicates that the various methods and machines listed by the authors as having been constructed were ineffective. These methods included the artillery described as *petrariae* and *tormenta* by Fulcher of Chartres and Albert of Aachen, respectively. As a result, it can be concluded that the artillery available to the crusaders at this point of the siege of Nicaea was not of a high enough standard, sophistication or numbers to create an opportunity from which the crusaders could take the city. The manner in which artillery was employed during the First Crusade suggests that it fulfilled a

secondary role in crusade poliorcetics; this is evident in a number of case studies in this section.[19]

The points to take from this case study are, therefore, that the artillery reported to have been built at Nicaea following the battle with Kilij Arslan's forces were stone throwing but not very effective machines. They did not initially prove to have enough of an impact for them to be made the centrepiece of the crusader assault on the defences of the city.

DEFENDERS' ARTILLERY

Raymond d'Aguilers, p. 19:	Albert of Aachen, p. 110:
Praeterea muris eminemtibus ita cigitur, ut nullorum hominum assultus, nullis *machinae impetus* vereatur. *Balistaria* vero vincinarum turrim, sic respicientia sunt ad invicem, ut sine periculo nullus accedere possit. Si quis autem proprius accedere voluerit, obesse cum nequeat, facile de altitudine turrim obruitur.	...assultus plurimos inferrent, Baldwinus Calderun incessanter muros inpugnans, nimisque temerario et audaci conatu precurrens, in ictu emissi lapidis fractis ceruicibus uita expirauit. Baldwinus de Ganz dum ibidem in assultu urbis desudaret, et incaute muros impeterent, uertice transfixo in impetus sagitte uitam exalauit.

Although the primary aim of this thesis is to ascertain the typology and nature of crusader artillery used in the twelfth century, information about the artillery employed by the besieged at Nicaea is also important in contributing to an understanding of the terminology of the western narratives.

The First Crusade sources have a concentration of references to *balistae* and related terms in the earlier sieges of the campaign. It was seen above that Robert the Monk included *balistae* in his list of items built at the outset of the siege of Nicaea. Here there is a different type of reference. Raymond d'Aguilers is referring to the artillery of the besieged rather than that of the besieging but nevertheless this is another example of the sources for this crusade referring to *balistae* in the earlier

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[19] See below, 'Siege of Nicaea: Alternative Siege Tactics Applied to Nicaea', pp. 130-131; 'Siege of Jerusalem: Artillery Involvement in Siege-tower attack', pp. 194-209.

parts of the campaign. Not only is this is the only reference to there being *balistaria* defending the walls of the city during the siege, it is also the only term used by the First Crusade narratives to refer directly to artillery defending the city. There is no further evidence to corroborate or contradict the assertion of Raymond d'Aguilers that the city was defended by *balista* emplacements. In Raymond's work this is the only reference to *balistae* or *balista* emplacements amongst seven clear references to artillery. It is, consequently, a notable exception in Raymond d'Aguilers work. Raymond was a participant on the First Crusade and an eyewitness to the siege of Nicaea and his testimony must be taken seriously.[20] The term *balistaria* is clearly connected to the more complex term *balistae*, which has been interpreted by modern scholars as referring to crossbows as well as to artillery pieces: a debate surrounds the term.[21] The distinct term *balistaria*, however, refers to a '*balista* emplacement' rather than the weapon itself and, as this is the case, the apparatus described is most likely to have been artillery rather than crossbows. Hand held crossbows do not require set emplacements on the *muri* and *turres* of the city in the same manner as artillery might. The *balistaria* are also described as *sic respicientia sunt ad invicem, ut sine periculo nullus accedere possit*. A crossbow being a handheld device operated by one person has far more manoeurerability than its larger cousin, the *balista* and thus, the reference most likely refers to the latter as Raymond saw fit to discuss the facing (*respicientia*) or direction of the machines. If these devices were crossbows, the direction in which they were facing would be instantly changeable and, as a result, largely irrelevant to the description of the defences of the city. The discussion of the effective facing of these machines indicates the significance and size of them and intimates that turning them would have been a significant operation. Hence, these machines were artillery pieces. Given the loose nature of artillery nomenclature in the Middle Ages and the lack of further evidence, however, it is slightly dangerous to define the machines described by Raymond as classical *balistae* from their denotation as *balistaria*. The various uses of the term *balistae* will be identified throughout these First Crusade case studies and examined jointly towards the end of this chapter.[22]

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[20] Rd'A, Hills, p. 6.

[21] See above, 'Introduction', pp. 8-10.

[22] See below, 'First Crusade Case Studies: Conclusions – Artillery Typology in the First Crusade', pp. 214-225.

Albert of Aachen's account of the death of two Baldwins in the course of the siege sheds a further light on the nature of the defence of Nicaea. The death of *Baldwinus Calderun* from a fractured skull having been struck by a *lapis*, which had been fired from the city, indicates that the stone must have been projected with significant force.[23] On the other hand, there is no certain indication that this stone was thrown from an artillery piece; it may well have been thrown by hand from the top of the wall that *Baldwinus* was attacking as we are told that *Baldwinus incessanter muros inpugnans* and would, thus, have been close to the wall. Although the possibility that this was an artillery piece cannot be ignored, one cannot say with certainty if it was one or not. The effect of the thrown stone must merely be noted as a possible result of the actions of a defensive artillery piece. Baldwin of Ghent, advocate of St Pierre-au-Mont-Blandin and lord of Aalst, on the other hand, was killed by an arrow and there is no reason to think that artillery was involved in his death.[24]

HEADS THROWN INTO THE CITY[25]

Gesta Francorum, p. 182:	Peter Tudebode, p. 23:	Albert of Aachen, p. 108:	Baldric of Dol, p. 27:	Guibert of Nogent, p. 146:	Robert the Monk, p. 757:
Proiiciebant autem nostri capita occisorum *funda* in urbem, ut inde Turci magis terrerentur.	Elatis itaque eorum capitibus, projecerunt illa in *funda cujusdam instrumenti* in civitatem; unde magis dolerent illi qui intus erant	Iam huius primi belli turbine sedato circa Niceam, capita Turcorum amputata intra urbis menia iactabant, ad terrendos	multis autem internecioni deditis victoriosi redierunt, attulerunt etiam plurima caesorum capita, quae *fundibularii*	Qui a nostris gratanter, ut decebat, excepti, cesa sua capita pro testimonio nostrorum victoriae reliquerunt, quae post eorum fugam *balistis* ac	Qui iterum machinas ascendentes , ut majorum metum hostibus incuterent, *balistis et fundis* occisorum capita

[23] J. Riley-Smith, *The First Crusaders*, p. 200.

[24] *Ibid.*, pp. 85, 99, 141, 200.

[25] William of Tyre includes this event in his account incorporating mention of artillery (*machinis iaculatoriis*) but has no original information to offer; WT, p. 201.

magistros arcis et custodies murorum.	projecerunt in civitatem, ad obsidentium exsultatione m, ad obsessorum perturbation em.	*fundis* ad terrorem gentilium proiciebantur in urbem.	Turcorum intus projicibant

The throwing of heads of those slain in battle over the walls into the city not only shows the frequently gruesome nature of medieval warfare but also provides some interesting evidence on the typology of the machines in use at Nicaea. The key term in the accounts is *funda,* which occurs in some manner in all five sources originating from the *Gesta* family of sources that report the matter. Its use by the author of the *Gesta Francorum* and the lack of alteration of the term by Peter Tudebode, both of whom were participants on the crusade, strongly suggest the presence of a sling in the workings of the machine that hurled heads over the wall. Baldric of Dol's account only edited the *funda* reference slightly and overall maintains the same information regarding artillery usage in this incident. The use of this term to define the machine indicates that the workings of the machine included a sling in some capacity. This presence of a sling in the apparatus of artillery has been identified as one of the key elements for the pinpointing of trebuchets as distinct from classical forms of artillery, in which the sling was a less common component.[26] The strong emphasis on a sling here would, thus, suggest that there might have been some form of trebuchet in use at the siege of Nicaea. It is difficult, however, to say more about these machines. There is nothing in this incident to suggest that these were particularly powerful machines as the weight of the missiles they were hurling, heads, would not have much exceeded six kilograms.[27] The power that would have been required to project a head over the walls of the city is not sufficient for it to be remarkable in the sources and, in the absence of more detail on this incident, any further identification of the typology of the *funda*

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[26] J. Bradbury, *The Medieval Siege*, pp. 266-7.
[27] W. T. Dempster & G. R. L. Gaughran, 'Properties of body segments based on size and weight', *American Journal of Anatomy*, 120 (1967), p. 52 - the exact weight range of a human head provided in this study is 5.119kg ± 0.838kg.

cujusdam instrumenti is difficult. What can be identified are probable trebuchets utilising slings that had sufficient power to propel heads over the city walls.

The independent account of Albert of Aachen, unfortunately, lacks a term directly indicating an artillery type for this incident; the most important term used here is *iactabant*. This term is not particularly revealing, however, and for the purposes of this discussion merely substantiates the account from the *Gesta* sources that heads were thrown over the walls. Albert's account can only be used as independent confirmation that this incident actually occurred.

This incident is noteworthy for providing another example of the use of the term *balistae* in the course of the early sieges of the First Crusade. The accounts of both Robert the Monk and Guibert of Nogent indicate that there might have been two different types of machines involved in this incident and, if this were true, in the siege as a whole. In this episode the weapon that the authors intended to indicate by use of the term *balistae* can certainly not have been a crossbow: throwing a head over the walls of the city would not have been possible for that kind of hand-held device. It might be argued that the throwing of a head from a machine designed for firing javelin or spear-type missiles, as the classical *balista* did, would have been problematic but not necessarily impossible, depending on the exact form of the machine and perhaps with some minor adjustments for the purpose. Whether or not this was a *balista* in the classical form, Robert the Monk and Guibert of Nogent were without doubt using the term *balistae* to refer to artillery pieces. This is important in the debate surrounding the term and its use in medieval sources. Clearly in some situations, including this one, *balistae* could be and was used to designate artillery. Thus, this incident has important implications for the wider understanding of medieval artillery terminology but its relevance to the actual events of the siege and what it can tell us about the machines used at Nicaea is still debatable.

If it were to be accepted that a classical balista could hurl heads with sufficient force to propel them over the city walls of Nicaea, then this incident could be taken as evience for the appearance of such machines at that siege. On the other hand, this is not certain to have been the case. The term *balista* was originally used

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in classical literature to denote a powerful stone-throwing machine and it was only at some point in the period 100 to 300 A.D. that the term *balista* came to mean an exclusively bolt-throwing machine.[28] There is a reference in the *Strategemata* of Sextus Julius Frontinus to the use of a *balista* for the propulsion of a single head over the walls of *Tigranocerta*:

> Domitius Corbulo, cum Tigranocertam obsideret et Armenii pertinaciter viderentur toleraturi obsidionem, in Vadandum ex megistanis, quos ceperat, animadvertit caputque eius *ballista* excussum intra munimenta hostium misit. Id forte decidit in medium concilium, quod cum maxime habebant barbari; ad cuius conspectum velut ostento consternati ad deditionem festinaverunt.[29]

If one applies Marsden's dates for the change of meaning of the term *balista*, the siege of *Tigranocerta* in 60 A.D. fits into the period before the change took place and at a point when the *balista* in question was likely not to have been in the form of a large crossbow but was, rather a stone-thrower with significant force. This work by Frontinus is a collection of anecdotes used to indicate different tactics and ploys that could be employed in warfare. This is not, however, to suggest that Robert the Monk used Frontinus' *Strategemata*: the passage is cited here as a classical example of the use of a *balista* to fire heads.

The earlier, stone-throwing form of *balista* would seem to be a more appropriate machine for the throwing of heads than the later bolt-throwing apparatus; it is possible, therefore, that in writing that *balistis et fundis occisorum capita Turcorum intus projicibant*, Robert the Monk or Guibert of Nogent may have had an earlier classical form of *balista* in mind and the author was not *au fait* with the more contemporary meaning of the term. It is also possible, however, that a bolt throwing machine could have been slightly altered to accommodate the throwing of heads or that the heads were impaled on the bolts and fired in that manner. The bolt-throwing interpretation of the term *balista* is likely to have been the one that military leaders of the Middle Ages would have had in mind if they were discussing or dealing with *balistae*. A late classical treatise on warfare and the only such treatise to survive into medieval Europe, Vegetius' *Epitoma rei militaris*, is known

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[28] E. W. Marsden, *Greek and Roman Artillery, Historical Development* (Oxford, 1969), pp. 2,188-9.

[29] Frontinus, *Strategemata*, II.9.5: *Frontinus: The stratagems, and, The aqueducts of Rome*, C. E. Bennett, ed., (London, 1925), p. 156.

to have been available to many important leaders and authors through the medieval period.[30] Vegetius' description of the *balista* is as follows:

> *Ballista* funibus nervinis tenditur, quae, quanto prolixiora brachiola habuerit, hoc est quanto maior fuerit, tanto spicula longuis mittit[31]

The clear indication in Vegetius that this artillery piece *spicula longuis mittit*, shows that it belongs to the period after the change in the terminology recognised by Marsden. This is the interpretation that the medieval military leaders exposed to Vegetius' work would have had of a *balista*. If the head-throwing machines described by Robert and Guibert could be shown to tally more with the earlier meaning of the word then, as a result, Guibert of Nogent and Robert the Monk could be suggested to have been out of touch with contemporary military matters and terminology and perhaps to have been taking their information regarding *balistae* from earlier classical sources rather than from knowledge of contemporary military practice but it is difficult to make that case with the limited evidence available from these sources.

The doubts about the nature of Robert the Monk's reference to *balistae* throwing heads into Nicaea have to be viewed in the light of his later reference to the throwing of heads at the siege of Antioch. Robert the Monk's account of the later siege recorded that *balistis incisa capita in civitate projecerunt.*[32] There is a consistency evident in the descriptions of the artillery involved in both these events: Robert the Monk reported the use of *balistae* in throwing heads both at Nicaea and Antioch. Additionally, the later incident at Antioch has no corresponding account in the *Gesta Francorum* while the inclusion of the event in the narrative of Albert of Aachen removes any doubt as to the veracity of the episode.[33] From the evidence at Antioch, it is clear that Robert the Monk must have had some additional information independent of that available to him through the *Gesta Francorum* and, from the evidence in Albert of Aachen's account, that this independent information had, at very least, some element of reliability. This raises the possibility that some

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[30] See below, 'First Crusade Case Studies: Conclusions – Artillery Typology in the First Crusade', pp. 214-225.

[31] E. W. Marsden, *Greek and Roman Artillery, Historical Development*, p. 236.

[32] RM, p. 777; also see below, 'Siege of Antioch: Turkish heads thrown over the walls', pp. 144-145.

[33] AA, pp. 236-8; also see below, 'Siege of Antioch: Turkish heads thrown over the walls', pp. 144-145.

informed person supplied information to Robert regarding the use of *balistae* in the throwing of heads at Antioch. It is not beyond the realms of possibility that the same person supplied similar information regarding the similar episode at Nicaea. Thus, the evidence in the *Historia Iherosolimitana* provides a possible explanation for the transformation of the *Gesta Francorum's* word *funda* to Robert the Monk's *balistae* and *fundae*. Given the number of references to *balistae* in the course of the siege of Nicaea, it cannot be ruled out that some form of *balistae* were used in the throwing of heads over the walls of Nicaea in the course of the siege.[34]

COUNT RAYMOND'S ARTILLERY ASSAULT ON A MURAL TOWER[35]

Albert of Aachen, pp. 112-4:

> Alia post hec die dum creberrimi assultus plurimorum in uanum consumerentur, comes Reimundus turrim quandam *duobus tormentis lapidum que uulgo dicuntur mangene* fortiter quassatam obpugnauit, sed minui et dissolui uel lapis unus ab hoc antiquo opere et cemento uix solubili robistissimo tam cotidiano iactu non potuit, dum ad extremum plura adaucta sunt lapidum quassantium *instrumenta*, quibus tandem muri concussi rimas per loca protulerunt, et aliqui lapides pre creberrima iactione cum cemento minui ac labi ceperunt.

This section of Albert of Aachen's work is very revealing about the strength of *mangene* as well as about the use of terminology by Albert regarding artillery. There was a significant period of over a month in which the artillery could be used against the defences of Nicaea. The first army groups arrived at Nicaea on 6 May 1097, and, as has been pointed out above, started to construct machines on 14 May.[36] The city surrendered on 19 June.[37] It could, however, take a significant amount of time to construct siege machines. At Arsuf in 1099, for example, Albert of Aachen recorded that it took six weeks to construct *machinas et instrumenta*

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[34] AA, p. 120; GF, p. 183; RM, p. 757; Stephen of Blois, p. 139.
[35] William of Tyre includes this event in his account incorporating several mentions of artillery (*machinis*; *machinis iaculatoriis*; *tormenta*; *tormenta*) but has no original information to offer; WT, pp. 205-6.
[36] H. Hagenmeyer, *Chronologie*, p. 70.
[37] *Ibid.*, p. 79.

mangenarum.[38] Taking all these pieces of information into account, there is scope for at least several days during which the use of artillery against this tower would have been possible. Despite this significant period of time, damage to the tower seems to have been minimal. Only when extra machines were added to the attacking effort was headway made and it is clear from the account of this incident that the damage caused was not huge and that a breach was not achieved. It does show, however, that they had the ability to attack walls with some hope of success. A secondary element of this incident to note is that the artillery pieces in question are clearly depicted as stone throwing engines.

It is unfortunate that there is only one First Crusade source that makes mention of this event. Albert of Aachen is, however, a reliable source for the First Crusade and the most useful for the issues surrounding artillery. As a result, there need be no doubt surrounding the vercity of this account. What must be questioned is how much of a generalisation can be drawn from this incident. Was the strength of the artillery pieces exhibited here something that was true in a broader sense too or is this an isolated incident in a time when artillery was usually much more powerful? The nature of the incidents examined so far does not suggest that this was an aberration but more evidence is needed to be certain if this was the case.

MISSILE PROTECTION FOR UNDERMINERS

Gesta Francorum, p. 183:	Raymond d'Aguilers, p. 21:	Baldric of Dol, p. 27:	Guibert of Nogent, p. 146:
Denique comes Sancti Egidii et episcopus Podiensis consiliati sunt in unum, qualiter facerent suffodi quamdam turrim, quae erat ante tentoria eorum.	Tandem per Dei voluntatem quidam de familia episcopi et comitis, satis periculose ad angularem turrim. Post vim facta testudine, unam de turribus cavare coeperunt, et	Aggressi itaque civitatem, colonos rebellantes, *balistis* et *arcubus* et *fundis* deterrentes (grandinem etenim supervenientia tela putares), homines praeparatos ad muros usque	At beatae memoriae Pordiensis episcopus et Sancti Egidii comes Raimundus, infirmando urbis statui insistentes, turrim quondam, quae erat ipsorum

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[38] AA, p. 486; also, see below, 'Siege of Arsuf: Construction of Siege engines', pp. 235-236.

Ordinati sunt homines qui hanc suffodiant, et *arbalistae et sagittarii*, qui eos undique defendant[39]	cavando ad terram prostraverunt.	direxerunt, et ne quid eis mali possent oppidani moliri, sagaciter eos tuebantur; suffoderunt itaque turrem radicitus, immissisque lignis, et igni in muro terebrato succenso, indemnes redierunt ad suos.	contigua castris, factis subter ad eius fundamenta enervanda *cuniculis* destituere agressi sunt. Fossoribus igitur ad haec efficienda locates, cum *arcibalistis* et arcubus et *balearis habenae* tortoribus pariter suffodientium defensores adduntur.

The protection provided here for the *homines qui hanc [turrim] suffodiant* consisited of *arbalistae et sagittarii*; this reference is one which may or may not refer to artillery. As has been noted in a number of cases already, the term *balistis* is an ambiguous one.[40] This specific derivative of the term, *arbalistae*, is unique to this incident and does not appear at any other juncture in the narratives of the First Crusade. Although in a different form from other references to *balistae* in other sources, this is another example of references to *balistae* in the early part of the First Crusade narratives. This is the only use of such a term in the *Gesta Francorum*.

The term *arbalistae* was akin to *arcuballista*, which was originally from the late antique period.[41] After having been superseded by torsion artillery, non-torsion artillery disappeared from use in the third century B.C. and only reappeared again in the fourth century A.D. with the appellation *arcuballista*.[42] It is from *arcuballista* that the term arbalest developed and it has also been posited that it was from this

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[39] The account of Peter Tudebode also includes this incident but it is too similar to the account of the *Gesta Francorum* to merit inclusion here as a separate source; PT, p. 23.

[40] See above, 'Siege of Nicaea: Construction of Equipment by the Crusaders on Ascension Day', p. 108-110; 'Siege of Nicaea: Battle against Kilij Arslan', pp. 111-113; 'Siege of Nicaea: Defenders' Artillery', p. 117-119; 'Siege of Nicaea: Heads Thrown into the City', p. 119-124.

[41] J.F. Niermeyer & C. Van de Kieft, *Mediae Latinitatis Lexicon Minus*, I, p. 77.

[42] E. W. Marsden, *Greek and Roman Artillery, Historical Development*, pp. 2, 188-9.

machine that the medieval crossbow developed.[43] Thus, the term may point towards an interpretation as a crossbow than as an artillery piece; the term itself is not the only information available in this instance, however.

The apposition of *arbalistae* and *sagittarii* in this extract is worthy of discussion: the author may have been attempting, simply, to describe the weaponry employed by the men involved in this action or he may have been purposely juxtaposing or equating the two terms for the further information of his audience. The term *sagitarii* refers to archers specifically rather than to the weaponry. By examining uses of the term *sagitarii* and variations of it throughout the *Gesta Francorum*, there can be absolutely no doubt that the Anonymous' uses of the term referred to archers and arrows in the normal sense and not some form of bolt shot from an artillery piece.[44] In this specific example, it is clear that the instruments and soldiers under discussion operated in an anti-personnel manner to protect the underminers. There is no mention here of the *arbalistae et sagitarii* being used to damage the walls or support large scale assaults on the defences: rather their role was one of protection for the underminers. This points to their use against soldiers defending the city, who might try to disrupt the work of the underminers. That much is clear; what is less obvious is the extent to which the apposition of the terms is important. It is possible that in this instance the *Gesta Francorum* is giving information both on the instrument used to fire projectiles, the *arbalistae*, as well as on the soldiers who fired them, *sagitarii*. If that is taken to be the case, the apposition of the terms would seem to suggest a correlation rather than a juxtaposition in their meanings and, as a result both of this and of the history of the term, it would be prudent to regard this quotation not as a reference to artillery but more likely, although not definitely, as a reference to crossbows and arrows. The apposition of military terms provides a possible opportunity to eke out some information about an author's nomenclature and treatment of artillery. A reference to *ballistae et arcus* in the early part of the siege of Nicaea has already been dealt with.[45] As well as this, in the course of the narratives of the crusade there are a

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[43] *Ibid.*
[44] GF, pp. 122, 200, 206, 215, 247, 286, 315, 350, 374, 407, 493, 496.
[45] Stephen of Blois, p. 139; also see above, 'Siege of Nicaea: Battle against Kilij Arslan', pp. 111-113.

number of occasions where the term *sagitarii* or a similar term is apposed with a term that has associations with artillery. This occurs both here and in twice later, in the course of the siege of Antioch.[46] The differing nature of these various references is interesting; two appose *arbalistae et sagittarii* and *ballistariis et sagittariis*, while the third, during Albert of Aachen's description of the strugge to control the *Waiferii* Gate, places *sagittae et mangene* side by side. The appearance of *mangene* in the same context as *arbalistae* and *balistarii* belies the importance of the apposition. There is no suggestion that, in using the term *mangene*, Albert of Aachen was referring to a weapon that was the equivalent of that to which it was apposed and as a result the importance of similar apposition in the cases of *arbalistae* and *balistarii* should also be noted as less than crucial in an attempt to identify artillery types.

Baldric of Dol's account of the incident adds something different. As well as mentioning the use of *balistis et arcubus* to protect the underminers, Baldric wrote that *fundae* were used. The term *funda* has been seen in numerous contexts in Baldric's work as a term depicting artillery.[47] Clearly Badric felt that some sort of artillery was used in the course of these events. Baldric was not an eyewitness, however, and his testimony must be treated with caution. Though his account cannot necessarily be taken as evidence of exactly what machinery was present at the siege of Nicaea, Baldric's work, based on the *Gesta Francorum* but attempting to improve it, shows us how a scholar of the early twelfth century interpreted the phrase *arbalistae et sagittarii* as was written in the *Gesta*. Baldric's addition of *funda*, an artillery term, to his account suggests that he interpreted the *Gesta* turn of

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[46] See below, 'Siege of Antioch: Battle at Waiferii Gate', pp. 138-142 and 'Siege of Antioch: Construction of Mahomerie's Tower, counter-fortification', p. 146-148.

[47] GF, p. 182, PT, p. 23, BD, p. 27, GN, p. 146, RM, p. 757, also see above, 'Siege of Nicaea: Heads Thrown into the City, pp. 119-124; FC, p. 221, also see above, 'Siege of Antioch: Throwing of Heads by the Defenders', pp. 137-138; RC, p. 674, also see below, 'Siege of Ma'arrat-an-Numan: Building of Equipment by Crusaders', pp. 164-166; PT, p. 107, also see below, 'Siege of Jerusalem: Messenger/Spy thrown toward city', pp. 185-189; RC, p. 692, also see below, 'Siege of Jerusalem: Artillery Involvement in Siege-tower attack', pp. 194-209; *De Expugnatione Lyxbonensi*, ed. C. W. David, p. 134, also see below, 'Siege of Lisbon: Artillery Attack on the Walls of Lisbon', pp. 302-303; *De Expugnatione Lyxbonensi*, ed. C. W. David, p. 142, also see below, 'Siege of Lisbon: Organisation and Effect of Artillery Crews', pp. 305-306.

phrase as meaning artillery. If this were not the case, it would perhaps not make sense for him to add artillery pieces to a situation in which they were not previously depicted as being used. Furthermore, there is another point in his narrative where Baldric used the term *balistae* in a sense that marks it out clearly as an artillery term.[48] There are, therefore, several reasons to deduce that Baldric read the *Gesta*'s use of the term *arbalistae* as a depiction of artillery.

Guibert of Nogent also adds a different element to the interpretation of this event. His account not only mentions the use of *arcibalistis et arcubus* but also *Balearis habenae*. As in the work of Baldric of Dol, the inclusion in the description of the event of a weapon that is evidently an artillery piece is revealing evidence about Guibert's interpretation of the meaning of the language of the *Gesta Francorum*. As in the case of Baldric's changes to the *Gesta*, this seems to intimate that Guibert interpreted the phrase *arbalistae et sagittarii* as a depiction of artillery. There is another piece of information in this segment of Guibert's work, however, that sheds light on the nature and reliablilty of his source: mention of the construction of a *cuniculum* or tunnel by the crusaders is unique to the work of Guibert. As has been discussed above, this reference to the use of a tunnel is out of place and casts serious doubts on the veracity of Guibert's assertions on military matters.[49]

Unlike the other accounts, Raymond d'Aguilers's version of an undermining attempt at Nicaea involved the use of a *testudo* as cover while the walls were undermined.[50] This is a significant difference from the other versions as there is no reported artillery involvement in this account of the event.

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[48] BD, p. 54; also see below, 'Siege of Antioch: Bohemond's Speech', pp. 152-153.
[49] See above, 'Guibert of Nogent', pp. 41-43.
[50] For a discussion and description of the *testudo* see J. Bradbury, *The Medieval Siege*, pp. 270-4 and R. Rogers, *Latin Siege Warfare in the Twelfth Century*, p. 252.

Albert of Aachen, pp. 120-2:

> ...et quia nullo conamine *machinarum* aut *balistarum* aut impetu uirium, muris aliquam lesionem inferred poterant, sed omnis labor et uirtus eorum incassum consumebatur.

> [A Lombard approached the leaders and said that, as the the siege was not progressing well, he could make a machine to help]

> Magister itaque artis facta predicta conuentione ingenia sua aptat, parietes decliues connectit, et uirgeas crates assuit mirifico instrumento, sub cuius protectione ipse et secum desudantes capita sua tuta a iaculis Turcorum desuper resistentium.

The limitations of artillery are visible here. Albert of Aachen wrote that none of the machines, *balistae* or strong assaults were having any effect on the walls and the siege was not progressing as hoped. The crusader force, therefore, changed tack and employed the services of a *magister* who constructed *mirificum instrumentum* to solve the problem of the failing *machinae*, *balistae* and *impetus uirium*. This suggests that the weakness of artillery exhibited at earlier stages of the siege was not a limited example and that this weakness was prevalent for the siege of Nicaea as a whole.[51] In this siege the role of artillery seems to have been ancillary. Despite the listing of artillery pieces among the major crusader actions of the siege, the artillery could not affect a breach or sufficient cover to allow an assault to succeed.

For the purposes of the examination of terminology, the use of the word *balistae* here is significant: it is clear in this instance that these were not crossbows and that Albert of Aachen was referring rather to artillery pieces. Had they been crossbows or similar small weapons operated by a single soldier, they would not have merited a mention among the major actions of the siege. It is clear that the *machinae*, the *balistae* and the *impetus* were the major attempts by the crusaders to capture the city rather than a list of all the weapons employed; such a list would be likely to include references to other smaller weapons such as spears, bows, swords

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[51] See above, 'Siege of Nicaea: Count Raymond's Artillery Assault on a Mural Tower', pp. 124-125.

and so forth. However, a lack of any description of the morphology or action of the *balistae* means that an accurate identification of the weaponry involved here, based solely on this incident is impossible. All that can be said from the context is that this quotation certainly refers to artillery.

THE AFTERMATH OF THE SIEGE

Guibert of Nogent, p. 153:

> Civitate itaque reddita et Turcis Constantinopolim ductis, tirannicus ille princeps, nimium de urbis restitutione gavisus, nostrorum primoribus munera infinita largitur et quibusque pauperrimis elemosina copiosa tribuitur. Ex quo mediocribus exercitus personis, quas munificentia illa est visa pretergredi, multa fuit invidentia contra principes ac simultas ingentia. Nec iuxta quondam modum id prorsus iniuria! Hi nempe exercuere prelia, ad hos attinuit totius obsidionis effectus, molium vectiones, *machinarum balistarumque* impactio, hi, inquam ut brevior claudam, *portavere pondus diei et estus*.

This is a unique passage about the siege of Nicaea. Rather than giving information on the course of the siege, it is instead a general retrospective on the siege. Brought about by the perceived improper manner in which Emperor Alexius I treated some members of the crusading forces, this diatribe against the actions of the emperor gives an interesting insight into the organisation of the armies of the crusade and the type of people who were operating the siege machinery in those forces. Alexius presented the crusader princes (*nostrorum primoribus*) with many gifts (*munera infinita*) to compensate them for his acceptance of the surrender of Nicaea – an act that meant the crusaders missed out on the chance to enrich themselves through the plunder of the city. At the same time Alexius gave alms (*elemosina copiosa tribuitur*) to the poor on crusade. In doing so, Alexius pacified both the rich and poor on crusade but the *mediocribus exercitus personis*, the middle or average men in the army, were left unsated, with no lavish gifts, no alms and no opportunity to plunder. These *mediocres* are clearly identified by an earlier passage in Guibert's account as the middle part of a tripartite system. A speech by Bohemond referred to '*cunctae personae magni, minores atque mediocres.*'[52] The

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[52] GN, p. 201. See also, C. Kostick, *The Social Structure of the First Crusade*, p. 76.

place of this group in the social organisation of the First Crusade is, thus, made clear.

Guibert also informs the reader that the events following the fall of the city were unfair to those who were *mediocres*, as it was they who had performed the hard work in the course of the siege, including the operation of the siege artillery - *machinarum balistarumque impactio*. Thus, there is a clear indication given here about who it was that operated these machines. At the siege of Jerusalem the *Gesta Francorum* reported that *aliquis* from the entire army was offered monetary incentives to be involved in the menial task of filling defensive ditches with stones, which was clearly an unskilled task.[53] One presumes the upper echelons were not involved in this task but the offer was apparently open to all who wished to avail of it. This is in contrast to this section of Guibert's work where it is clear that it was the middle-ranking men of the army who operated the machinery and that the task was not delegated to the general membership of the crusading army and its attendant elements. There is no clear indication that *the mediocres* were necessarily the only ones involved in the operation of the siege engines: it is possible that some of the so-called *pauperes* were involved in the action too. But Guibert is clear that it was the *mediocres* that did most of the work – *portavere pondus diei et estus* – even though it is not clearly stated that they did all such work. Indeed, there is a suggestion in a later section of Guibert's work that certain elements of the army's poor were involved in throwing stones but not through the use of machines.[54] There is, therefore, a sense both in this section and that later part of Guibert's work that, given the importance of efficient artillery actions to the siege process, the operation of these machines was not a job that could safely be entrusted to the *pauperes* in the same manner that other siege related tasks such as the filling of ditches could be. It is difficult to generalise given the multitude of different tasks involved in the operation of these machines but, as a result of the information provided by Guibert here, the manning of artillery pieces should be viewed as a skilled or, at least, partially skilled task. It should, of course, also be noted that Guibert of Nogent has

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[53] GF, p. 469.
[54] GN, pp. 310-11; also see below, 'Siege of Jerusalem: The *Tafurs*', pp. 212-213.

been shown to be a somewhat dubious source for military specifics.[55] The veracity of this account as it pertains to the specifics of the siege of Nicaea should be treated with an element of scepticism. Such scepticism is especially pertinent when one considers what William of Tyre had to state on the matter. In describing the situation of the Christians in Antioch during the crusader siege of that city, William wrote that the defenders of the city forced those Christians to carry out certain necessary tasks such as carrying heavy beams for siege engines and, crucially, operating the ropes of the artillery pieces.[56] Entrusting the task to forced labour may suggest that this was not as specalised a task as might be deduced from Guibert's account. Taking into account the number of other unknown factors that might have been in play here, possibly including manpower issues and desperation, it is not possible to state clearly how exactly one should define the complexity of the task of operating these machines.

SIEGE OF ANTIOCH (1097-8)[57]

It is worth noting that this siege, in contrast to those of Nicaea and Jerusalem, had relatively little use for artillery – or, more accurately, only used artillery in quite specific situations. This can be explained by the strong natural defensive position of Antioch, which was not conducive to the large-scale use of artillery either to attack the walls or those on them due to their height on the mountain. The crusader siege ran from 22 October 1097 to 3 June 1098.[58] Only a few days after that crusader triumph Kerbogha, emir of Mosul, arrived with a strong force and besieged the crusaders in Antioch. That blockade lasted until Kerbogha was defeated in battle outside Antioch on 28 June 1098.[59]

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[55] See above, 'Guibert of Nogent', pp. 41-43.

[56] WT, p. 296; also see below, 'Siege of Antioch: The Treatment of the Christians Within Antioch', pp. 148-152.

[57] T. Asbridge, *The First Crusade*, pp. 153-240; J. Bradbury, *The Medieval Siege*, pp. 109-14; J. France, *Victory in the East*, pp. 197-296; H. E. Mayer, *The Crusades*, pp. 48-53; J. Riley-Smith, *The Crusades*, pp. 37-41; R. Rogers, *Latin Siege Warfare in the Twelfth Century*, pp. 25-39; S. Runciman, *A History of the Crusades*, I, pp. 213-49; C. Tyerman, *God's War*, pp. 132-47.

[58] H. Hagenmeyer, *Chronologie*, pp. 107, 151-3.

[59] *Ibid.*, pp. 175-6.

STRENGTH OF ANTIOCH'S FORTIFICATIONS

Raymond d'Aguilers, p. 32:

> Tenet autem haec civitas duo milliaria in longitudine, muris et turribus, et antemurabilis ita munita, ut nullius machinae impetus, nullis hominum assultus, etiam si omne genus hominum conveniat, vereatur

Raymond d'Aguilers' description of the defences of the city of Antioch is important here in the manner that he describes the impregnability of the defences. More specifically, it is the reported futility of using *machinae impetus* that is important. The phrase used is clearly a general one meant to indicate any kind of artillery piece rather than one specific type; it is also clear that the phrase is not one that even indicates the type of missile fired by the *machinae*. The impregnability of the city is something of a topos in descriptions of cities being besieged but in this instance it does fit with the course of the siege and the lack of use the crusaders had for artillery pieces during the lengthy engagement.

BUILDING OF EQUIPMENT BY THE CRUSADERS

Raymond d'Aguilers, p. 61:	**Robert the Monk, p. 775:**
factae sunt etiam in castris *machinae*, quae muros civitatis impellerent; sed hoc frustrata	Construuntur a Christicolis bellica machinamenta ad oppugnandum congrua, turres ligneae, *balistae*, falces, arietes, sues, talpae, tela, sudes, et *fundae*, et si qua ali potuerunt ulla excogitari mente

The two quotations provided here are from different parts of the narrative but both refer to the machines that were built and used in the general course of the siege; Raymond d'Aguilers' quotation is from a later part of his narrative of the siege and, rather than reporting the building of machines, the section reports the failure of the application of those machines that had been built. Raymond's *Historia Francorum* is quite general in its treatment of what was built: the only term used is

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machinae. Robert the Monk, on the other hand, gives a substantial list of the equipment constructed. He also uses a general term, *bellica machinamenta*, but then follows it up by detailing, in list form, exactly what kind of *machinamentae* were built.

The information provided by Robert the Monk has no corresponding entry in the *Gesta Francorum*. This is, therefore, another occasion wherein Robert the Monk seems to have used a separate source of information.[60] Robert the Monk has a strong reliance on the work of the *Gesta Francorum* and the moments when he departs from the *Gesta* are important. This example is especially intriguing in the level of detail provided by Robert the Monk: he lists nine different types of machine that were constructed by the crusaders. The veracity of Robert the Monk's added detail can be determined by investigating if the listed machines and tools appear in the accounts of the siege. Two of the *bellica machinamenta* mentioned are related to artillery – the *balistae* and the *fundae* – and, given the number of artillery references in the course of the siege, there is no reason to doubt their presence at Antioch. Attention must instead be turned to the *turres ligneae, falces, arietes, sues, talpae, tela* and *sudes*. *Falces, tela* and *sudes* are all small tools that are present in the records of the siege. Peter Tudebode reported the use of a *talpa* ('mole') during the assault by the crusaders against the bridge in front of the *Waiferii* Gate.[61] The presence of a machine depicted rather like a *sus* is given in the account of Albert of Aachen in the course of the same action against the *Waiferii* Gate. The presence of both *talpae* and *sues* ('sows') as separate items on Robert the Monk's list remains, however, problematic as it is likely that both these accounts refer to the single machine used in the attempt to destroy the bridge in front of Antioch's *Waiferii* gate. There is, therefore, possible evidence at Antioch for the use both a *sus* and a *talpa* but it is somewhat complicated and doubts must remain over the veracity of that section of the list. A larger problem with Robert the Monk's list arises with his assertion that *turres ligneae* and *arietes* were constructed. There is no reference in any of the primary sources for the siege of Antioch to siege-towers or battering rams having been used. At a stretch, the *turres ligneae* could perhaps be explained

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[60] This is also evident at the siege of Nicaea, see above, 'Heads Thrown into the City', p. 119-124.

[61] See below, pp. 139-140 and 'Peter Tudebode', pp. 50-1.

by the construction of counter-fortifications. Anselm of Ribemont in a description of what was built says that the counter-fortification built to control the Bridge Gate had *muroque firmissio necnon et duabus turribus munito*.[62] There is some evidence, therefore, for the crusaders constructing towers at Antioch but this is, at best, a partial explanation since the description of the construction of the same fortification in the *Gesta Francorum* clearly states that the counter-fortification was built *de lapidibus* not from wood, as Robert the Monk's *turres ligneae* were.[63] Moreover, Albert of Aachen wrote that the same counter-fortification was built of stone, noting *nam penuria illic erat lignorum*.[64] It is thus unlikely that the *turres ligneae* could have been an accurate reference to the construction of a counter-fortification. Robert's mention of the construction of *arietes* is also a mystery, as there is no mention of the use of such a machine at Antioch. Overall this section of Robert the Monk's account reads like a list of all the siege equipment he could name rather than as a concerted effort accurately to depict what was built. Thus, it is best treated as a rhetorical flourish intended to illustrate the lengths the Christian forces went to in their attempts to capture Antioch by showing that they constructed every machine conceivable to Robert the Monk.[65]

For the direct purposes of this investigation the two key elements to note in the list are *balistae* and *fundae*. Given the nature of the rest of the list provided by Robert the Monk, however, it is debatable how much can be read into the use of the term. References to *fundae* have been signalled elsewhere as pointers to the presence of trebuchets, since slings were a key component in the working of such devices.[66] The doubts the about the veracity of Robert the Monk's list of pieces of equipment constructed mean that this particular reference is not one that can be used to point conclusively to the presence of trebuchets at the siege, especially as there is little other direct corroborating evidence. The issue of the mention of *balistae* in the list is different: there are several other references during the siege to

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[62] H. Hagenmeyer, *Epistuale et Chartae*, p. 158; also see below, 'Construction of Mahomerie's Tower, counter-fortification', pp. 146-148.

[63] See below, 'Construction of Mahomerie's Tower, counter-fortification', pp. 146-148 and GF, p. 288.

[64] AA, p. 224.

[65] Also, see above, 'Robert the Monk', p. 25.

[66] J. Bradbury, *The Medieval Siege*, pp. 266-7; also see below, p. 187.

the use of *balistae* and so it stands to reason that, if they were present as the authors claim, they must have been constructed at some point and this point in the chronology of the siege would seem to be the most likely for that construction.

One could also note that the length of the list provided by Robert the Monk also serves to indicate the limited role played by artillery. There is no precedence given to the artillery over the other *bellica machinamenta* that were reported to have been built and it can, thus, be seen that the leaders of the crusader siege actions saw the need for more than just artillery pieces in the process of attempting to capture the city. This serves to underline the secondary role artillery played in both this siege and in the course of the First Crusade as a whole.

THROWING OF HEADS BY THE DEFENDERS

Fulcher of Chartres, p. 221:

> ...conversabantur, scilicet, Graeci, Syris, Armeniis Turci rabie occidebant permoti, et *petrariis* et *fundibulis* suis capita occisorum, Francis cernentibus, extra muros ejiciebant.

Fulcher of Chartres is the only account to record this incident of the defenders of Antioch throwing heads out of the city. The terms *petraria* and *fundibula* are in keeping with the regular artillery nomenclature of Fulcher's work. In discussing the artillery terminology of Fulcher of Chartres, it is impossible to ignore the clear overarching patterns of nomenclature in his work. The use of artillery terminology in the *Historia Hierosolymitana* is closely tied to the manner in which the first version of that work was later redacted by the author. His work contains two main terms for artillery: *petraria* and *tormenta*. Every use of the term *petraria* occurred in the first redaction of the work whereas the uses of *tormenta* all occurred during the second redaction.[67] As such, the appearance of *petraria* in this instance is typical of Fulcher's first redaction nomenclature and one must be wary of the possibility that the term was being used in a very general sense and not necessarily as a genuine attempt to depict accurately the typology of the machines

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[67] For a discussion of the two redactions of Fulcher of Chartres' work, see above, 'Fulcher of Chartres', p. 54.

used to throw heads during the siege of Antioch. One must also take into account the possibility that the machines used to throw heads from inside the city were not visible to the crusaders outside. In the light of this uncertainty, it is difficult to apply the use of the term *petraria* in an identification of typology in this instance.

Fulcher of Chartres's use of *fundibula*, however, adds slightly more to the typology discussion than that of *petraria*. Although the issue of the visibility of the artillery remains, the term is one that clearly indicates something about the morphology of the machinery: namely that slings were present in their apparatus. The presence of slings makes an identification of trebuchets possible but it is far from a certainty, based on that evidence alone.

The throwing of heads is an action that indicates the minimum strength of the artillery employed by the defenders of Antioch. As has already been pointed out, the weight of a human head and neck is between four and six kilograms.[68] As a result, it can be concluded that the machines used to throw heads possessed, at very least, the capacity to propel missiles of that mass. This level of performance is not, however, particularly remarkable and does not preclude those artillery pieces from being capable of much higher levels of performance in the course of their other applications.

BATTLE AT *WAIFERII* GATE[69]

Albert of Aachen, pp. 202-4:

> [Realising the problem presented by sallies through the *Waiferii* gate, the crusaders resolved to prevent egress from that gate. They initially tried to demolish the bridge in front of the gate *cum instrumento malleorum ferreorum, cum ligonibus et*

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[68] See above, 'Siege of Nicaea: Heads Thrown into the City', pp. 119-124; also, see below, 'Siege of Antioch: Turkish Heads Thrown over the Walls', pp. 144-145; W. T. Dempster & G. R. L. Gaughran, 'Properties of body segments based on size and weight', *Americal Journal of Anatomy*, 120 (1967), p. 52 - the exact weight range of a human head provided in this study is 5.119kg ± 0.838kg.

[69] William of Tyre includes this event in his account incorporating several mentions of artillery (*machinam iaculatoriis iterum tormentis*; *jaculatorias... machina*) but has no original information to offer; WT, p. 255.

securibus. When this failed they built a siege-engine which they intended to place on the bridge. This machine would keep them protected while blocking off the gate.]

Turci hac uisa structura ad menia contendentes, sagittis et *mangenarum* iactu in ponte luctantes Gallos feriunt, quatenus sic percussos a ponte et machina arcere ualerent. Similiter ex aduerso Christiani in sagittis et baleari arcu resistentes, fortiter hostes minibus impugnant, quosque filium cuiusdam ammiraldi sagitta trans iecur perfodiunt. Illius uero interitu et fidelium repugnatione Turci indignati, ampliori ira feruescunt, et tandem in unum collecto robore suorum, repente portam aperentes egressi uiriliter machinam assiliunt, custodies subito instant et expugnant, ignem piceasque faces, et sulfureum fomentum fortiter machine ingerunt, totam eam in fauillam redigentes. Custodes uero machine periculum uite sue metuentes, licet inuiti exire coguntur in fugam precipites uix defensi et elapsi. Peregrinorum autem milites et principes uidentes se hac arte nil proficere, sequenti die *instrumenta trium mangenarum* opponunt ponti, qui portam Waiferii et turrim porte eiusque menia crebro iactu et impetus saxorum quaterent et attererent, murosque exteriores qui erant ante murale in plurima frusta minuerunt, quod Franci barbicanas uocant. Sed nic in contritione porte preualuerunt. Cum uero nil proficerent, quadam die ex communi consilio robora arborea ingentia, et uix mobilia et saxa miri ponderis et magnitudinis, in uirtute et conatu mille loricatorum trans pontem porte adouluerunt, impedimento Turcis exire et nocere uolentibus.

This extract details the besiegers' attempts to close off egress from the *Waiferii* Gate (or 'Dog Gate'), through which the besieged had been launching sorties to harass the Christian camp. Opening through the walls of Antioch about half way along the western side, this gate was in an important position relative to the crusader forces massed on the west of the city. This is borne out by the destructive nature of the sallies from the gate. Dealing with sallies from the city and closing off the avenues through which those sallies took place were two of the major components of the crusader actions during the siege of Antioch. It is in this context that we see a number of attempts to close off the *Waiferii* Gate, of which crucially artillery was only one element.

There is a possible parallel to this event in Albert of Aachen's *Historia Ierosolimitana* to be found in Peter Tudebode's *Historia de Hiersolymitano Itinere*, which says:

Hoc statim ordinaverunt ut facerent maximam *talpam* cum qua potuissent perforare pontem quod et fecerunt. Quadam die praeliaverunt supra pontem et duxerunt *talpam*; fueruntque multi mortui Turci, et pons fuit perforatus. Nocte vero veniente,

dormientibus nostris, exierunt Turci de civitate et arserunt *talpam* et restauraverunt pontem; unde nimis Christi ecercitus fiut iratus.[70]

It should be noted, however, that, although there are similarities in the accounts of Peter Tudebode and Albert of Aachen, these incidents occur at different times in their chronologies of the siege – Albert placed the events at the very start of the siege, whereas Peter Tudebode's incident should be placed at some point after early March 1098, as it is included his account of the attempts to destroy a bridge after the establishment of both counter-fortifications by the crusaders. The two incidents are also recorded as having occurred at different gates. Albert of Aachen's account explicitly places the events at the *Waiferii* Gate whereas Peter Tudebode's later events are at the Bridge Gate where Mahomerie's tower had just been established. It is Albert of Aachen's attack on the *Waiferii* Gate rather than Peter Tudebode's assault on the Bridge Gate that is of interest here for the purposes of the study of artillery. Although it is of minimal use, Peter Tudebode's account is provided to ensure that a possible second account of part of these assaults is not overlooked.

The methods used in the crusader attempt to close off the gate were both numerous and varied. The crusaders started with a direct attack on the bridge in front of the gate *cum instrumento malleorum ferreorum, cum ligonibus et securibus*; the failure of that direct assault on the bridge structure, because it was an *opus insolubile, antiquorum cementis et ingeniis fundatam* led to an attempt by the crusaders to build a *machinam ex strue lignorum et uimineo*. This machine seems to have been some sort of sow or movable cover to allow the crusaders to occupy the bridge in safety. This also failed as a method of controlling the gate when it was destroyed by fire in a sally by the defenders. It was only following this second failure that the crusaders employed artillery against this part of the city. Peter Tudebode's account, if it is taken to be an description of the same event, would appear to conflate Albert's first two attempts to destroy the bridge. His account has a *talpam cum qua potuissent perforare pontem* that was used in a vain effort to destroy the bridge whereas the *machina* described by Albert of Aachen appears to have played a much more inert and stationary role than a machine that *potuissent perforare pontem*. The exact morphology of the *machina* or *talpa* is not the concern

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[70] PT, pp. 50-1.

of this study, however: more relevant is the nature of the artillery used in this incident.

The establishment of *instrumenta trium mangenarum* against the gate met with limited success. The account tells that the aim of the *mangene* was: *portam Waiferii et turrim porte eiusque menia crebro iactu et impetus saxorum quaterent et attererent, murosque exteriores*. There is a difference in the reported use of artillery here in comparison to the majority of other incidents of artillery usage in the course of the First Crusade. This is a clear undertaking to damage the structures of defence rather than the personnel. The other major example of this comes only from Albert of Aachen's account of Count Raymond of St. Gilles' attack on a mural tower at Nicaea.[71] The *mangene* were not able to achieve this goal, however: Albert of Aachen's account reveals that *nec in contritione porte preualuerunt*. The failure of the artillery to destroy the gate is not surprising given the limited use of artillery to destroy masonry in the First Crusade and the similar lack of success when it was attempted at Nicaea. The failure of the artillery to damage the gateway sufficiently led the crusaders to blockade the bridge with some *robora arborea... et saxa miri ponderis et magnitudinis*. According to Albert, this succeeded in blocking off the gateway and the defenders were forced to make use of other gates for their attacks on the besiegers.

Taking Albert of Aachen's more detailed account, there were four distinct methods employed by the crusaders in this sequence of events: artillery was the third option and, like the first and second, failed. This tells us two things about the nature of artillery use in this period and specifically in this siege. The failure of the *mangene* show that artillery was not generally strong enough to affect strong masonry defences and it can be seen that, by not making use of artillery until two other methods of assault had failed, this limitation was at least partially recognised by the crusaders. The exact morphology of these machines is, however, elusive. As has been already discussed, Albert of Aachen made use of the term *mangene* too often for its appearance without subsidiary information to be used as a method of

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[71] See above, 'Count Raymond's Artillery Assault on a Mural Tower', pp. 124-125.

identifying type.[72] It is clear, however, that given the use to which these machines were put, they must have possessed significant power. The failure of the artillery to cause any significant damage to the gate and towers should not obscure the fact that the military leaders of the siege would have been highly unlikely to have used machines like this unless they held out some hope of success, however slight.

There is another artillery reference in the course of this account of the battle for control of the *Waiferii* Gate that appears when the crusaders were attacking with the *machina* the Turks *sagittis et mangenarum iactu*. Due to Albert of Aachen's general system of nomenclature, as illustrated by the reference to *instrumenta trium mangenarum* above, this terminology tells little about the actual type of artillery employed. What is interesting, however, is his apposition of *sagittis et mangenarum iactu*. The possible meaning of apposition of terms has been discussed a number of times already in the context of understanding the term *balistae*.[73] The word *mangena* is less contentious, however, and there is no confusion regarding it in the way there is regarding the definition of *balistae* as either a classical balista or a crossbow. This unambiguous phrase, *sagittis et mangenarum iactu*, therefore, aids the understanding of the term *balista*; it is clear in this situation that the apposition of the terms is not intended to imply that the *mangene* were firing arrows or that there was a close correlation in the nature of the weapons. Thus when examining the apposition of *balistae* and other terms, this incident can be seen as a precedent for there not necessarily being any correlation between the weaponry mentioned.

CAPTURED CHRISTIANS' HEADS THROWN FROM THE CITY

Albert of Aachen, p. 210:

> Cuius caput continuo *mangenellis* suis impontentes, una cum capite archidiaconi procul a muris in medios proiecerunt campos.

This description of the defenders' artillery is not especially important; the event seems calculated to depict the barbarity of the Turks rather than to offer a

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[72] See above, 'Albert of Aachen', pp. 59-60.

[73] See above, 'Siege of Nicaea: Battle against Kilij Arslan', pp. 111-113 and 'Siege of Nicaea: Heads Thrown into the City', pp. 119-124.

detailed description of artillery use. The heads thrown from the city belonged to an archdeacon and a lady who had been captured when a Turkish contingent ventured outside the walls. The use of the term *mangenella* fits well with the general themes of Albert of Aachen's artillery use.[74] We can conclude from this incident that the defenders of Antioch had artillery that was suitable for the purpose of throwing heads but the knowledge of those who informed Albert about the machine used from inside the walls must be questioned. They could have seen the artillery of the defenders when they captured the city but surely a considerable distance must have separated them from the machines hurling the heads at the moment that it occurred.

The important point to take from this description is that these *mangenelle*, noted elsewhere as *parua*, *minor* artillery pieces, were strong enough to hurl heads as missiles.[75] This makes a statement about the general strength of artillery in this period. As previously noted, a human head weighs between four and a half and six kilograms.[76] This incident makes it evident that throwing a missile of this weight was within the operational range of a *minor* artillery piece. It is not clear, however, if throwing six kilograms was easily accomplished or whether it tested these machines to their limits. Though there is no direct statement here regarding the strength of full size artillery pieces, it can be deduced that their throwing abilities exceeded that of these *mangenelle*. This point regarding the strength of artillery stands firm as general reflections on the state of artillery in the late eleventh and early twelfth century even though the reliability of Albert's sources as witnesses to this exact moment in time must be questioned.

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[74] See above, 'Albert of Aachen', pp. 59-61.

[75] AA, p. 424; C. DuCange, *Glossarium mediae et infimae Latinitatis*, II, col. 427; See above, 'Albert of Aachen', pp. 60-61.

[76] W. T. Dempster & G. R. L. Gaughran, 'Properties of body segments based on size and weight', *Americal Journal of Anatomy*, 120 (1967), p. 52 - the exact weight range of a human head provided in this study is 5.119kg ± 0.838kg.

TURKISH HEADS THROWN OVER THE WALLS[77]

Albert of Aachen, pp. 236-8:	Robert the Monk, p. 777:
Christiani uero ad augendum Turcis dolorem capita Turcorum trans menia et muros iactauerunt, cetera ferme ducenta, hastis et palis infixa in aspectu omnium circumstantium ad menia extulerunt.	Multos ex eis captos ad castra conduxerunt, et coram illis qui supra moenia inclytae urbis erant, decollaverunt. Et, ut majorem illis dolorem incuterent et terrorem, *balistis* incisa capita in civitate projecerunt.

As at Nicaea, this is an example of *balistae* being mentioned in the process of throwing heads over the walls of a besieged city.[78] Both in this incident at Antioch and that at Nicaea, it is the account of Robert the Monk that contains the reference to *balistae* being used in this manner. This is an unusual, though not unique, event from the account of Robert the Monk in that there is no corresponding information his *fons formalis*, the *Gesta Francorum*. There is, however, corroborating evidence from Albert of Aachen, which is especially important, considering that Albert of Aachen's information on the crusade came from different avenues than that in the *Gesta Francorum* and its associated sources and, thus, provides independent confirmation that this event took place.

The lack of a specific term in Albert of Aachen's account describing the artillery used in this incident is lamentable. The use of the term *balista* by Robert the Monk is interesting but it cannot be considered in isolation: the *Historia Iherosolimitana* has a precedent for the use of *balistae* in connection with the throwing of heads having recorded such a use during the siege of Nicaea.[79] In that instance, Robert the Monk's was the only account which mentioned *balistae* and *fundae*, with both the *Gesta Francorum* and Peter Tudebode referring merely to *fundae*. The reappearance of *balistae* in connection with the tossing of heads has two implications. Firstly, this second account can be seen as a continuation of the earlier terminology usage, which had little corroboration at Nicaea and could thus

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[77] William of Tyre includes this event in his account incorporating mention of artillery (*machinis iaculatoriis*) but has no original information to offer; WT, pp. 273-4.

[78] See above, 'Siege of Nicaea: Heads Thrown into the City', p. 119-124.

[79] RM, p. 757.

be seen as equally doubtful. Secondly in this instance, Robert the Monk clearly has a source of information independent from the *Gesta Francorum* and it is not beyond the realms of possibility that the same source that informed him about this incident involving throwing heads also gave him the information that was in his account of Nicaea but not in that of the *Gesta Francorum* or Peter Tudebode. It must, however, be borne in mind that his list of equipment constructed at the siege of Antioch is problematic and must be dealt with cautiously.[80] Overall, there is some reason to take this second reference to the throwing of heads by *balistae* seriously. The event certainly happened: Albert of Aachen testifies to that. It is only the exact typology of the artillery used that is elusive. This can also be taken as another clear example of the use of the term *balitae* to denote artillery.

CONSTRUCTION OF EQUIPMENT

Letter of the People of Lucca, p. 166:	**Albert of Aachen, p. 238:**
cum peruenissemus Antiochem, nos, qui per mare naugabamus, exercitus, qui per terrem undique confluxerat, uix bene ciuitatem iam circumsederat. sequenti die principes nostri procedunt ad mare uisitandi nos gratia. hortantur nos, ut ad construenda *belli machinas* copiosam lignorum conferamus materiam quod factum magnum nobis fuit dispendium.	Tandem consilio reperto Boemundum principem Sicilie et Euerardum de Poisat, Reimundum comitem de Prouincia, Warnerum de Greis, ad portam maris qui dicitur Symeonis heremite propter emendos cibos cum plurimis peditibus dirigunt, et ut uocarent socios ad opem construendi presidii, qui in ipso littore maris propter naues que escas adducebant morabantur.

The arrival of ships to aid in the siege of Antioch occurred during late February or March 1098. In the section immediately following the extract from the 'Letter of the people of Lucca' the discussion is of constructing a counter-fortification on *tertio autem Nonas Martii* or 5 March 1098.[81] In this, the first piece of information in the letter about the new arrivals' involvement in the siege, there is mention of construction of machines.

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[80] See above, 'Siege of Antioch: Building of Equipment by the Crusaders', p. 134-137.

[81] H. Hagenmeyer, *Epistulae et Chartae*, p. 166; also quoted below in section, 'Siege of Antioch: Construction of Mahomerie's Tower, counter-fortification', p. 146-148.

It is unclear exactly what was built at this juncture; the term *belli machinas* merely discloses that an uncertain number of machines of war were built; Albert of Aachen's account adds little to this. It is clear that these were made *lignorum*; it is possible that what was constructed included artillery though, as noted above, overall there was little need or use for artillery during this siege. It is clear from this that the construction of equipment continued throughout the siege when the materials were available. Other than noting the possibility that artillery pieces were constructed here there is little to take from this incident.

CONSTRUCTION OF MAHOMERIE'S TOWER, COUNTER-FORTIFICATION

Anselm of Ribemont, pp. 158-9:	People of Lucca, p. 166:	*Gesta Francorum*, pp. 287-8:	Albert of Aachen, p. 224
His itaque patratis, nostri firmare castellum coeperunt, illo quoque multiplici uallo muroque firmissio necnon et duabus turribus munito, comitem S. Aegedii cum *ballistariis* et sagittariis conlocauerunt. ... Pars quaedam nostri exercitus castellum orientale alia pars castra seruabat, ceteri omnes castellum firmabant. Ex illis *ballistarii* et sagittarii portam custodiebant, reliqui et ipsi principes aggerem iacere, lapides portare, murum	tertio autem Nonas Martii, id est prima die Veneris, statuunt nostri in occidentali porta ciutatis castellum erigere, iactu *ballistae* proximum, quod nunc beatae Mariae dicitur.	Tertia vero die coepimus simul iuncti cum gaudio magno aedificare castrum supradictum, de lapidibus scilicet quos abstraximus de tumulis Turcorum.	Hiis creberrimis Turcorum insidiis et assiduis a port predicta exitibus et suorum miserrimis casibus primores exercitus conturbati, acuuntur ira ampliora, et portam prefatam, que difficultate montium et inequalitate scopulorum obsideri non poterat, hoc obstaculo impediri consulunt, uidelicet ut munitionem quondam in dorso cuisdam silicis stantis ad radicem montium locarent, firmissimum uallo et congerie

construere non			lapidum. Nam
cessebant.			penuria illic erat
			lignorum.

The accounts of the construction of a counter-fortification at the Bridge Gate to the south-west of Antioch provide two separate pieces of information regarding the nature of artillery in the First Crusade. The account from the people of Lucca, based on the testimony of *Brunus*, one of their number who was an eyewitness to the siege of Antioch, tells that the counter-fortification was constructed *iactu ballistae proximum*.[82] As well as what this tells us about the distance of the position from the walls, it also shows the terms in which those involved in the siege were thinking – 'balista' shot lengths. The use of the term *balistae* in reference to the counter-fortification suggests, despite not stating directly, the involvement of *balistae* in the actions of that position; indeed, the easiest way to be certain of the distance to the walls in terms of *balistae* shots is to have been using *balistae* and observing their range in action from that position.

The terminology used to describe the position of the counter-fortification relative to the defences in the 'letter of the people of Lucca' is made all the more relevant when the testimony supplied by Anselm of Ribemont is considered. His account tells of the men who both fought in the fortification and protected it as it was being built. There is a symmetry in the terms used by these two sources; the 'letter from the people of Lucca' related the distance of the counter-fortification from the defences in terms of *iactu ballistae* and that of Anselm of Ribemont refers to the defenders of this position in terms of *ballistariis et sagittariis*. The terms 'balista-men/balista emplacement and arrow-men/archers' suggest that they are two distinct elements to the force protecting and operating within the fortification, two different types of troops. That does not mean that their equipment was necessarily diametrically opposed in form; clearly, these were both missile troops. The phrasing of this incident is somewhat different from the terminology used by the *Gesta Francorum* during the course of the siege of Nicaea when the Anonymous referred to *arbalistae et sagittarii*.[83] In that case there was a clear difference between the use

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[82] See above, 'Eyewitness Letters', pp. 76-77.

[83] GF, p. 183; also see above, 'Siege of Nicaea: Missile Protection for Underminers', pp. 125-129.

of terms in which one was a reference to a type of equipment, *arbalistae*, while the other was a reference to a type of soldier, *sagittarii*. Here there is a clearer distinction between what is being referred to by the terms. Thus it can be conjectured that the equipment of the *balistarii* of this incident was different from that of the *sagitarii*, who were clearly firing arrows. However, whether or not to define the equipment of Anselm of Ribemont's *balistariae* as artillery pieces or as crossbows is more debatable given the problematic nature of the term. The use of the term for *balistae* emplacements (*balistaria*) suggests the presence of large machines rather than crossbows wielded by individual soldiers. Thus, it would appear that the machines employed by the crusaders to defend Mahomerie's Tower were *balistae* rather than crossbows.

THE TREATMENT OF THE CHRISTIANS WITHIN ANTIOCH

William of Tyre, p. 296:

> Porro cives ab ipso primo nostrorum introitu, ex quo circa urbem locata est obsidio, suspectos habuerunt Graecos, Syros et Armenios, et alios cujuscunque generis, Christianae fidei professores... Nam si erigendae erant *machinae* aut immensi ponderis transferendae trabes, statim id eis muneris injungebatur. Hi lapides et caementa et quamcunque materiam ad opus aedificiorum necessariam circumferre compellebantur; hi *jaculatoriis* etiam *machinis*, molares qui extra mitterentur tenebantur ministrare; et *funibus* quibus extra contorquebantur inservire, pro arbitrio praefectorum sine intermissione, nulla data requie, cogebantur.

Amongst the major written sources for the First Crusade, this section detailing the treatment of the Christians in Antioch is unique to William of Tyre's *Historia*. William's account, although not written until between the late 1160s and the early 1180s, has unique information to add even to the earliest years of the crusade story.[84] Edbury and Rowe, in their work *William of Tyre: Historian of the Latin East*, have identified William's use of oral traditions for events as far back as the battle of Doraylaeum, which preceded the siege of Antioch, as well as for the

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[84] See above, 'William of Tyre', p. 83.

siege of Antioch itself.[85] There is a possible precedent for the description offered here by William of Tyre. Guibert of Nogent wrote that:

> Cogebantur autem Armenii ac Syri, cum essent Christiani, sagittas ad nostros emittere, quidam autem ex ipsis et ipsipsum sponte faciebant.[86]

Although reporting the forced, and voluntary, involvement of Christians inside the city in military matters, this description has no mention of artillery and does not fully explain where William found information on the issue. With limited parallels in the major written sources that are known to have been employed by William of Tyre in the construction of his First Crusade narrative, the information about the treatment of Christians in Antioch is likely to have been gleaned from oral sources. An examination of the *Chanson d'Antioche*, an Old French poem that represents one oral tradition, contains no similar discussion of the treatment of Christians in Antioch.[87] Consequently, that tradition can be ruled out as a possible source for this information. For William to glean this information from an oral source, however, the information must have gone through several intermediataries before coming to his attention in the third quarter of the twelfth century, up to eighty years after the events themselves. As a result, there must remain a question mark over the veracity of the description as an actual representation of the course of events at Antioch. The information provided on artillery can be taken as evidence for the types of machines contemporary to William as well as possibly being representative of the equipment employed by the defenders of Antioch.

The discussion of the treatment of the Christian occupants of Antioch comes about during William's description of the capture of the city through the ceding of control of part of the city's walls and towers to Bohemond. William's description of the hardships inflicted on the Christians leads into an account of how they were all to be killed by the city's defenders on the very same night that the crusaders took control of the city. As a result, the leaders of the defence took the noise of the crusader assault as the tumult raised by the planned slaughter of the Christians and they, therefore, were lax in responding to the defensive crisis that had been thrust upon them. The story as a whole, consequently, is intended to show the coincidental

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[85] P. W. Edbury and J. G. Rowe, *William of Tyre*, p. 52.
[86] GN, p. 192.
[87] *La Chanson d'Antioche*, S. Duparc-Quioc, ed., 2 vols. (Paris, 1977-8); *La Chanson d'Antioche*, P. Paris, ed., 2 vols. (Geneva, 1969).

timing of these events and the backfiring of the plans to murder the Christian occupants of the city. This somewhat fortuitous turn of events was presumably envisaged by William as a subtle example of divine will. Thus, to an extent, the description of the harsh conditions the Christians endured is a cog in a wheel with the larger purpose of showing the involvement of God in the favour of Christians. A further problem associated with the use of this passage is the date of writing. As William of Tyre wrote so long after the event and was reliant on second, third or, perhaps, fourth hand information, can this information be reliably employed as evidence describing the events that transpired during the siege of Antioch? It would, perhaps, be more prudent to recognise the possibility that these conditions existed in Antioch as reported but to only take the artillery information as evidence for the type of artillery utilised in later years, around the time of William's writing.

The passage details how the unfortunate Christians were forced to carry rocks for the defensive artillery as well as playing a role in operating those artillery pieces. The precise details provided and wording used by William suggest that the artillery pieces he was trying to depict were traction trebuchets. The key element is that that the men involved had to *inservio* (serve the interests of and pay attention to) the *funes* (ropes) of the *iaculatoriae machinae*. Accordingly, it would appear that a crucial part of the working of these machines involved the operation of the ropes. To power an artillery piece, there were two methods of propulsion that used ropes in a central role: traction and torsion. A torsion engine, which employed ropes in a twisted bundle to provide impetus to the arm or arms of a piece of artillery, is exemplified by the classical *onager* and some forms of the *balista*.[88] The ropes in a traction engine, on the other hand, were pulled on by teams; in this manner one arm of these lever engines was pulled down causing the other to rise and project the missile in the intended direction. The survival of classical torsion machines into the Middle Ages is a much debated topic.[89] Rudolf Schneider, in his *Die Artillerie des Mittelalters*, has argued that the necessary twised sinew and rope for a torsion

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[88] For a brief description of torsion artillery see R. Rogers, *Latin Siege Warfare in the Twelfth Century*, pp. 255-6. For a more detailed discussion of torsion and other classical artillery forms see E. W. Marsden, *Greek and Roman artillery*, 2 vols (Oxford, 1969-71).
[89] See above, 'Introduction', pp. 8-10.

machine is not visible in the medieval sources.[90] For Schneider, *Hebelgeschütze* – lever artillery or trebuchets – dominated the centuries before and after the years in which the early crusades took place. There is some evidence to suggest that *balistae* may have been used in the First Crusade, however, and *balistae* in their classical form propelled their missiles through the use of torsion energy provided by twisted ropes.[91] That does not, however, necessarily mean that torsion power was used during the First Crusade as crusader *balistae*, if they existed, may have utilised the tension power – provided by bending the wooden arms of a *balista* – rather than torsion energy. The ropes described here fit best with those necessary to power a traction trebuchet, not *balistae*. Taking care of the ropes involved in a torsion engine would have been a somewhat specialised task – certainly more specalised than pulling on a rope in time with a team of men. This work force, essentially slave labour, would seem to have been far better suited to the task of pulling ropes than to that of tightening bundles of ropes in any kind of specialised manner. As a result, the *molares* mentioned above were more likely to have been thrown by traction trebuchets than any other kind of artillery piece. As discussed, however, there are problems associated with using this passage as evidence for the siege of Antioch. This evidence for the presence of traction trebuchets should, therefore, be applied to the mid to late twelfth century. When William of Tyre wrote, traction trebuchets were one, if not the major, form of artillery available to the crusaders.

The detail provided by this section of William of Tyre's work has implications for the understanding of the nature of the work involved in operating artillery. Guibert of Nogent, in discussing the siege of Nicaea, seemed to suggest that the operation of the crusader artillery pieces was a task assigned to the *mediocres* crusaders. From that it could be suggested that the task was important enough that it could not be assigned to the *pauperes* in the same manner as the filling of ditches with rocks sometimes was.[92] These possible conclusions are weakened somewhat by the details supplied in the above section of William of Tyre's work. Is the assigning of at least part of the task of operating the artillery

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[90] Schneider, *Die Artillerie des Mittelalters*, pp. 10-16.
[91] 'First Crusade Case Studies: Conclusions – Artillery Typology in the First Crusade', pp. 214-225.
[92] See above, 'Siege of Nicaea: Aftermath of the Siege', pp. 131-133.

pieces consistent with the work being seen as a specialised undertaking? There are, of course, many other factors in play here. It is possible that the defenders of Antioch enlisted this forced labour as no other alternative existed. It is equally possible that the crusaders at Nicaea were so flush with manpower at that early stage of the crusade that they did not need to use the *pauperes* even though those perceived lesser men would have been capable of completing the task. This apparent clash of the little available evidence makes it difficult to adjudicate effectively and reach a conclusion on the nature of the task of operating artillery.

BOHEMOND'S SPEECH

Baldric of Dol, p. 54:

> Civitas haec, ut videtis, inexpugnabilis est. Nam quid hic arietes, quid *balistae*, quid quaelibet ad expugnandam civitatem hic prodessent machinae? Restat ergo ut ad consiliorum divertamus experimenta, quandoquidem nobis non prosunt, vel quorumlibet armorum congressuum machinamenta.

This quotation from Baldric of Dol's narrative, a section of a speech attributed to Bohemond, is a description of the impregnable nature of Antioch. Bohemond was portrayed as using this problem in an attempt to garner support among the princes for taking control of the city if he could bring about its capture. It was in this context that Baldric, writing for Bohemond, used the term *balista*. Much like an incident in the *Historia* of Albert of Aachen about Nicaea, this incident places *balista* among a list of major actions by the besiegers that failed in their goal of bringing about the fall of the city.[93] The use of the term in this instance is such that it is clearly marked out as an artillery term rather than a reference to crossbows, as *balista* might be interpreted. The listing of *balistae* alongside *arietes* and other *machinae* shows that this was not a small weapon. This is not a list of all the hand held weaponry employed during the siege but rather it is a list of the major actions employed by the crusaders in their attempts to capture Antioch. Although there was limited scope for the use of artillery during the siege of Antioch, there remain a

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[93] AA, pp. 120-2; also see above 'Siege of Nicaea: Alternative Siege Tactics Applied to Nicaea', pp. 130-131.

number of instances of artillery use during the siege that may have been the subject of this reported speech.

DEFENCE OF MAHOMERIE'S TOWER AGAINST KERBOGHA

Raymond d'Aguilers, pp. 83-5:

Nostri autem prima die castellum comitis munierunt, metuentes, si ad bellum procederent, ut ad hostibus qui in castello erant, civitas corripeteretur, vel si castellum quod ante portem erat, desererent, et illud hostes occuparent, facultatem pugnandi, et aditum egrediendi nobis recluderent

...tertia die castrum oppugnant, atqus ibi tanta vi certatum est, ut sola Die virtus defen castrum, et resistere adversariis crederetur. Tamque cum iam transcendere vallum et dirvere murum pararent, nescio unde concepto timore, praecipites in fugam ruunt. Decurso itaque aliquantulo spatio, cum fugre causam nullam conspicerent, timidiatem suam causantes ad oppugnationem redeunt, et quasi satisfacturi pro pudore habitae fugae, vehementius imminerent, rursus Dei virtute vehementiu terrentur. Itaque hostes ad castra sua redunt ea die. Alia autem die, cum maximo apparatu ad castrum redire coeperunt; nostri vero castrum incendunt, atque moenibus civitatis se intrudunt.

Albert of Aachen, pp. 296-8:

comes Robertus Flandriensis accitis quingentis uiris belligeris, audito aduentu gentilium, ipsum presidium ingressus tueri disposuit, ne uirtus Turcorum illud subito occupans peregrinis pontem et aquam transire uolentibus magno esset impedimento. Prefata itaque duo milia Turcorum destinata ad riunam presidii in uirte magna et armorum tumultu confluxerunt ad locum presidii undique irruentes et inpugnantes iaculis et arcu. Quin tandem pedites facti, trans ullum moliebantur currere, ingenti tubarum stridore et solita uociferatione presidia grauiter uexaurent. Sed Robertus suique consodales, uidentes sibi angustias imminere ab hostibus, et scientes se crudelibus penis consumi si uicti eorum ditioni subderentur, uiriliter pro anima inimicis resistebant, lanceis et *balistis* hostes fortiter impetentes et ui a uallo arcentes

The context of this incident is interesting in itself: having captured the city of Antioch through the treachery of a defender, the army of the First Crusade found itself besieged in turn by Kerbogha while the citadel was still held by the city's ruler. This action between the forces of the crusade and those of Kerbogha occurred during a Turkish attempt to capture a position that had originally functioned as a crusader counter-fortification in the siege but which at the time was acting as a outer defence for the gate it once assaulted. Albert of Aachen, in the passage

immediately preceding the text quoted here, stated that the counter-fortification he was writing about was:

> sub ipso ponte qui trans fluuium ab urbe porrigitur et in quo firmato presidio Reimundus egit custodiam quousque urbs a Christianis capta est.[94]

This clearly identified the counter-fortification as Mahomerie's Tower, the construction of which is discussed above.[95] Though Raymond d'Aguilers partly corroborated the events described by Albert, his account makes no reference to artillery or archery and as such is of limited use for the purposes of this enquiry.

It was this same counter-fortification in which, it was reported by Anselm of Ribemont, *ballistariis et sagittariis*[96] were stationed and which a letter written by the people of Lucca described as being *iactu ballistae proximum*.[97] It must be realised, therefore, that the reference to *balistae* in Albert of Aachen's version of this event is not an isolated reference to that type of weapon with regard to this counter-fortification. It is notable that these three references to *balistarii* and *balistae* with regard to this fortification come from three different, unrelated sources for the First Crusade. As a result, there can be no doubt that *balistae* were used in the defence of this position both when the fortification was being used aggressively to close a path of egress from the city and when it was protecting the gate from Kerbogha's onslaught. The form that these *balistae* took is more debatable.

In this instance Albert reported that the fortification was defended by the use of *lanceae et balistae*. The two weapons placed together in this form are clearly not interrelated; a *lancea* was a spear or lance, which is inherently different from the projectile weapon that a *balista* was. There is no doubt that in the course of his account of the First Crusade and the subsequent years in the nascent crusader principalities Albert used *lanceis* only in the sense of a lance or spear. The most

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[94] AA, p. 296.
[95] See above, 'Siege of Antioch: Construction of Mahomerie's Tower, counter-fortification', pp. 146-148.
[96] Anselm of Ribemont, p. 158.
[97] Epistule of the People of Lucca, H. Hagenmeyer, ed., *Epistulae et Chartae*, p. 166.

noteworthy use of the term is to describe the Holy Lance discovered in Antioch while the crusaders were besieged by Kerbogha. It is a term that Albert of Aachen often used as part of lists of weaponry wielded by the crusaders and other forces. There are a multitude of different types of weapon mentioned in use alongside *lanceis* in various parts of the narrative, varying from *gladis* and *sagittae* to *fundibulae* and *arcus*.[98] The range of the terms applied alongside have little pattern. It is noteworthy, however, that if the word *balista* is to be seen as an artillery reference in this incident then this would be the only time in the course of Albert of Aachen's work that *lanceis* or a varient was apposed with an artillery piece.

As has often been the case, apart from the term used there is little information in this one incident that can be used to extrapolate the exact nature of the equipment that was used. It is clear that these items were applied in an anti-personnel fashion but this is hardly surprising when, at this juncture of the events at Antioch and at this position of the city circuit, the opposing forces possessed no fortifications which artillery could attack. Thus, the only target available to any crusader missile weaponry, whether artillery or archers, was the soldiers in the besieging forces. It is the appearance of the *balistae* in more than one reference to Mahomerie's Tower and, especially, the nature of the reference to *balista* emplacements in the earlier reference that means that the presence of *balistae* can be identified with some certainty at Antioch.[99]

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[98] AA, pp. 46, 52, 352, 428, 462, 536, 622, 676, 692, 726, 728, 730, 732, 748, 756, 792, 874, 876.

[99] Anselm of Ribemont, p. 158; also see above, 'Siege of Antioch: Construction of Mahomerie's Tower, counter-fortification', pp. 146-148.

Gesta Francorum, pp. 349-50:	Raymond d'Aguilers, p. 121:	Peter Tudebode:
		p. 68: Nos denique, qui remansimus in cititate nequivimus sufferre pondus neque arma illorum qui erant in castrum. Fecimus murum inter nos et illos quem vigilabamus deique nocteque
Itaque Turci habientes in castello intra urbem bellabant nobiscum diu noctuque, et nihil aliud disseparabat nos nisi arma. Videntes hos nostri, quod non possent diu haec pati, quoniam qui habebat panem, non licebat ei manducare, et qui habebat aquam, non licebat bibere, fecerunt murum inter nos et ipsos petra et calce, et aedificaverunt castellum et *machinas*, ut securi essent. Pars autem Turcorum remansit in castello agendo nobiscum bellum, alia vero pars hospitata erat prope castellum in una valle.	Quaesitum est eo tempore quis civitatem custodiret contra illos qui in castra erant, dum alii ad pugnam progrederentut. Fecerunt in colle nostri montis, contra hostes murum calceum et propugnalcula, et munierunt haec multis *petrariis*, et dimiserunt ibi Raymundum comitem, et viros usque ducentos.	**p. 72:** Itaque Turci habitantes in castello intra civitatem ballabant nobiscum die ac nocte, ita quod nihil aliud disseparabat nos nisi arma. Aliquando exibant cum illis quatuor amiralii qui erant omnes cooperti auro et equi eorum similiter usque ad juncturam genuum, qui amiralii conducebant eos. Videntes hoc nostri quod non potuissent diu pati, quoniam qui habebat panem non licebat manducare, et qui habebat aquam non licebat bibere. Tunc nostri fecerunt murum inter nos et illos in montanea, et aedificaverunt quasi castellum et *machinam* ut securi fuissent

A common usage of *machinae* in the sources was to indicate a siege-tower. This is highly unlikely to have been the case here, however, as there would seem to

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[100] William of Tyre includes this event in his account incorporating mention of artillery (*machinas iaculatorias*) but has no original information to offer; WT, p. 331.

have been no role for a siege tower in this defensive wall, at any rate not a movable tower. The nature of these *machinae* must thus be examined. Their most likely form would seem to be artillery as it is questionable what other kind of machine would be useful to the crusaders in this situation. Deployed in a defensive manner to ward off sallies from the citadel, any postulated artillery would be most likely to have been primarily, if not entirely, applied to anti-personnel activities against the enemy soldiers. This function would not single out these *machinae* as any different from the artillery applied elsewhere in the campaign, as the primary function of artillery in the sieges of the First Crusade was anti-personnel.[101]

Whatever kind of machine was built here, however, the unfortunate fact remains that the sources provide no information on their working. Thus, even though it can be said that their most likely form could be argued to be artillery, this evidence adds little to the attempt to identify the typology or nature of artillery in this crusade. On the other hand, we can note that there was no action recorded in the city during the battle outside the walls; this would suggest that the wall and *machinae* built by the beleagured crusader force were effective enough, when combined with the efforts of Count Raymond and his troops, to ward off the forces of the citadel. Whatever these engines of war were, they were either effective in their application or were never put to the test.

CONTROL OF EDESSA (1098)[102]

The city of Edessa came into the hands of Baldwin of Boulogne in March 1098 during the siege of Antioch following the assassination of the Edessa's ruler, Thoros. Baldwin had been adopted by Thoros as his son and successor and, as a result, his accession to position of first count of Edessa was largely bloodless, apart from the death of Thoros himself. There is, however, no indication whether or not Baldwin played any role in Thoros' assassination. There was no siege of Edessa at

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[101] See below, 'The Tactical Application of Artillery', p. 228-232.

[102] T. Asbridge, *The First Crusade*, pp. 150-2; J. France, *Victory in the East*, p. 132; H. E. Mayer, *The Crusades*, p. 49; S. Runciman, *A History of the Crusades*, I, pp. 204-6.

this time. Nevertheless, there are some references to the possible use of artillery pieces in the city leading up to Baldwin's accession.

MANGENE IN EDESSA

Albert of Aachen, pp. 172-4, quotation from p. 174 only:

> [While in Edessa, Baldwin was asked to take the place of the duke if the citizens were to overthrow the duke. Baldwin refused but said he would talk to the duke.]
>
> Et ecce turrim ascendens sic ei locutus est. 'Omnes ciues et prefecti cuitatis huius in necem tuam conspirati in omni genere armorum ad turrim hanc in furore et impetus animi properant, quod doleo et moleste perfero. Sed ut uliqua ratione liberari posses, uel rerum tuarum datione, preuenire non neglexi.' Vix dux colloquentem sibi audiuit, et ecce in circuitu turris multitudo ciuium in obsidione et impugnatione confluxit, incessabili *mangenarum* et sagittarum iactu muros et turris hostia quatientes.

The appearance of *mangene* in the course of events at Edessa in 1098 and the lack of specific artillery detail associated with it make its analysis problematic. It is evident from the description offered by Albert of Aachen that *mangene* were used in a violent attack on a tower that contained the city's ruler, Thoros. The nature of the event is such that one must question the scale of these machines. The term *mangene* is one whose connection to artillery in Albert's work cannot be questioned but some elements of its usage here do not seem to suggest a large and powerful siege engine. There is a contrast between the depiction of the engine as something that could be used inside the city and was accessible to citizens who flocked around (*confluxit*) a tower and the depiction of it as something that could shake the walls of the tower that was being assaulted. The latter piece of information would seem to indicate a weapon of considerable strength whereas the former elements of the description give the opposite sense.

It has been pointed out repeatedly through this thesis that the frequency with which Albert of Aachen used the term *mangene* as well as its Germanic nature raises questions about its specificity of the term. That it appears so often in the work raises the possibility that it may be a generic term for artillery that Albert used when

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not trying specifically to identify a particular type of machine. This possibility is increased when one takes into account that the term appears to have been rather generic in the German region as a whole at the time.[103] The nature of the description here might lead one to argue that the *mangene* mentioned here may have been smaller than those constructed and used in the course of the main sieges of the crusades. That conclusion, however, would not fit with Albert's terminology in other parts of his work where, on six occasions, he used the term *mangenella*, which he clearly employed to indicate small *mangene*.[104] Consequently, despite the awkwardness of the reference, it seems that Albert intended to convey that there were full sized artillery pieces in use against this tower in Edessa.

SIEGE OF SORORGIA (1098)

Albert of Aachen, p. 178:

> Baldwinus dux hoc comperto, in manu forti die statuto ad obsidionem urbis Sororgie proficisci disposuit cum *mangenis* et omni armorum appartu quibus urbs scindi et expugnari posset. Ciues uero Sarraceni uires et apparatum intolerabilem audientes formidine concussi, nuncia illi miserunt, ut pacifice ad eos descenderet, urbem sine contradictione susciperet, reditus quoque singulis annis sine dicioni non negaret.

After taking control of Edessa, Duke Baldwin vied for regional power with several local lords of whom a certain Balduk was the most problematic. It was in the course of ensuring local authority that Baldwin marched to invest Sororgia. The appearance of *mangene* in connection with Baldwin's capture of this town is out of keeping with the known logistical abilities of the First Crusade armies. There is an intimation here that the crusaders transported their *mangene* to the siege either fully constructed or ready to assemble. It was these 'intolerable' weapons, Albert of Aachen asserts, that caused the city to surrender without a fight. Transporting siege engines to a siege either complete or almost prepared is in contrast to the other sieges of the First Crusade in which the crusaders are consistently depicted as

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[103] See above, 'Western European Artillery Terminology in the Eleventh and Early Twelfth Centuries', pp. 103-104.

[104] For a discussion of the difference between *mangenella* and *mangene* in Albert of Aachen's *Historia* see above, 'Albert of Aachen', pp. 59-65.

needing to construct new siege engines; there is no evidence to suggest that the crusade employed a sophisticated siege train to transport equipment from siege to siege in their campaign.[105] Aside from this incident, the first time that the crusaders are shown in the sources preparing beforehand for a siege was in 1106.[106] The key difference between this instance and the other sieges that the crusaders conducted between 1097 and 1099 is that Duke Baldwin had the city of Edessa as a logistical base from which to launch his assault on Sororgia. It is also apparent from Albert's account of Baldwin's accession to power in Edessa that the people of that city possessed *mangene* that they used against the Thoros' tower.[107] The different set of circumstances created by Baldwin's control of a logistical centre makes any comparison between this incident and the preparations for the other sieges of the First Crusade irrelevant. It is only to the later period, when, after the end of the First Crusade, the crusaders had succeeded in establishing themselves as a landed power in the region, that a comparison is valid. When the crusaders had control of several urban centres they could carry out this type of preparation. The fact that there is no recorded siege train between this instance and the preparations for a siege of Sidon in 1106 is remarkable.

AFTERMATH OF ANTIOCH (1098)

Following the siege of Antioch there was a delay in the progress of the crusade. It was not until 1 November 1098, that the march towards Jerusalem restarted.[108] The crusaders were not entirely inactive in this period: they stayed in the general area surrounding Antioch and there were a number of engagements with

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[105] For the constant need to build engines anew during the First Crusade, see: 'Siege of Nicaea: Construction of Equipment by the Crusaders on Ascension Day', pp. 108-110; 'Siege of Nicaea: Construction of Equipment and Attacks on the City following the Battle', pp. 113-117; 'Siege of Antioch: Building of Equipment by the Crusaders', pp. 134-137; Siege of Antioch: Construction of Equipment', pp. 145-146; 'Siege of Ma'arrat-an-Numan: Building of Equipment by the Crusaders', pp. 164-166; 'Siege of 'Arqah: Crusader Equipment', pp. 174-180; 'Siege of Jerusalem: Building of Equipment by the Crusaders', pp. 184-185.

[106] See below 'Abandoned Plan to Besiege Sidon', pp. 251-253.

[107] See above '*Mangene* in Edessa', pp. 158-159.

[108] H. Hagenmeyer, *Chronologie*, p. 194.

the area's local powers including one against a local lord named Pakrad in the course of which some artillery may have been used.

GODFREY'S ATTACK ON PAKRAD

Albert of Aachen, p. 356:

> Hiis itaque iniuriis et pauperum querimoniis dux nunc commotus, quinquaginta milites suorum sequacium eligens, in lorcis, clipeis et lanceis, in *balistis* et sagittariis Armenicis protectus est ad uicinam arcem, in qua noxii predones Pancratii morabantur. Hanc, omni uirte instans, oppugnat repentino assultu, expugnatam flamma et igne humi coegit procumbere, uiginti ex militibus quos in ea reperit iussu eius excecatis, in retributione et undicta superbie et iniuriarum quos sibi Pancratius et pauperibus Christi inferre presumpsit.

The appearance of *balistae* at this point of Albert of Aachen's narrative provides a slightly different setting for the term than can be seen surrounding the other five references to *balistae* in the *Historia Ierosolimitana*. All the other references by Albert of Aachen to *balistae* occur during major siege actions: during the First Crusade the term appears once at each of the sieges of Nicaea and Antioch.[109] There are also three uses of the term at the later sieges of Arsuf (1099), Haifa (1100) and 'Arqah (1108).[110] The complexity and importance of the sieges of Nicaea and Antioch should be clear from the discussions of the case studies that have made up this chapter thus far. That those of Arsuf, Haifa and 'Arqah were also significant siege actions is evident from the descriptions of those sieges in Albert of Aachen's work. The actions of the Chrisitian forces at the siege of Arsuf included a notable investment of time with six weeks being spent constructing machines in preparation for assaults on the city; the siege of Haifa included the use of both *machinae* and *balistae* in the course of events in which the attacking forces blockaded the city by both land and sea; the siege of 'Arqah involved a three-week long blockade before the city surrendered – reportedly due to hunger. All five events were sieges of significant scale involving large investments of time, energy and logistics. Godfrey's action against Pakrad was different: it involved a small

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[109] AA, pp. 120, 298.
[110] *Ibid.*, pp. 488, 514, 774.

force that, according to Albert of Aachen, consisted of *quinquaginta milites*.[111] These men were armed with various pieces of weaponry and proceeded to attack and destroy Pakrad's fortress (*arx*). There is no indication of this being a long, drawn-out encounter or of there being large logistical investment in the operation. That is not to state, however, that this was not the case: rather that Albert of Aachen did not record it as having been the case. If Albert's silence about a large investment of time or logistics is to be taken as evidence that there was no such investment, then one could not but reason that the *balistae* mentioned here were not artillery pieces. To have such pieces at the attack on Pakrad's fortress would have required either their construction on site or their transportation to the fortress. Coming in the period following the crusader success at Antioch and being in the same region, it is not impossible that artillery pieces would have been available to Godfrey for his attack on Pakrad. This, however, would have involved the transportation of complete artillery pieces, either whole or broken into parts, to the site of the attack. There is no indication of any such operation in Albert's account and in the absence of such evidence it cannot be assumed that any such operation occureed. The construction of artillery pieces on site would have taken time that is not alluded to by Albert and which, thus, also cannot be assumed. Indeed, not only is there no evidence of the construction of machines at the site of this attack, there is evidence against their construction as Albert of Aachen's account suggests that the *quinquaginta milites* were called together and armed before setting out to attack Pakrad's *arx*. The mention of *balistae* comes in this context. The account suggests, therefore, that the *balistae* were carried with the men to attack Pakrad. The lack of a mention of complex logistical endeavour does not, however, completely preclude the *balistae* from having been artillery pieces.

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[111] Note on numbers: This force may well have been supplemented by other forces that did not include knights. Even if this was the case it is still clear that this was a relatively small force given that there were far more than fifty knights available to the entire crusading force. Furthermore, there is also the possibility or probability that the *quinquaginta milites* was an exaggeration as is so common in medieval sources. For discussions of the numbers involved in medieval armies see: T. Asbridge, *The First Crusade*, p. 89; B. Bachrach, 'Crusader logistics: from victory at Nicaea to resupply at Dorylaion' in J. Pryor, ed., *Logistics of Warfare in the Age of the Crusades*, pp. 46-50; H. Delbrück, *History of the Art of War within the Framework of Political History: The Middle Ages*, W. J Renfroe Jr., trans.; J. France, *Victory in the East*, pp. 122-42; J. F. Verbruggen, *The art of warfare in Western Europe during the Middle Ages*, pp. 6-10, 141-6, 252-3.

There is some suggestion in the list of equipment employed by the *quinquaginta milites* in the action against Pakrad that the *balistae* mentioned were not large pieces of equipment. Albert's list of items with which that force were supplied was given as follows: *lorcis, clipeis et lanceis, in balistis et sagittariis Armenicis*. Leaving *balistae* to one side for the moment, all the items listed are personal weapons or pieces of armour which would have only have taken a single man to operate or wear. The placement of *balistae* alongside and amongst swords and archers might suggest that they were equivalent items; that is, items small enough to be used by a single operator. This would indicate that the best interpretation of *balistae* in this situation may be as 'crossbow' rather than as artillery pieces, since crossbows would seem a better fit in the kind of list provided by Albert.

Overall this is an unsatisfactory account of this event but it is the only account available. The account provides a unique and interesting use of the term *balistae* in the work of Albert but there are several questions that the account leaves unanswered and numerous pieces of information are omitted. There is little information, for example, on how the fortress was captured: was this achieved without the use of the major pieces of equipment, such as artillery, often associated with assaults on fortified targets? It is interesting that not even ladders are mentioned as having been used. If the position was indeed captured without the use of major pieces of equipment, how was this possible? It was perhaps the case that the *arx* was poorly defended, badly stocked or in a state of disrepair. The apparent ease of the capture of the fortress hints either at deficiency in defence or at strength of the attack. As such, the possibility that the *balistae* mentioned here were artillery pieces cannot be ruled out conclusively as that would provide at least a partial explanation for the ease of the success. If that were the case, then the logistical effort put into transporting such artillery to the *arx* would have to be put into the category of the pieces of information that were omitted by Albert despite their being true. That said, the more tangible evidence provided by the nature of the list of equipment does suggest that the most likely, but not definite, case is that the *balistae* were, in this situation crossbows. The suggestion that they were artillery

pieces would, however, be in keeping with with the overall nomenclature evident in Albert's work and cannot be ruled out.

SIEGE OF MA'ARRAT-AN-NUMAN (1098)[112]

The siege of Ma'arrat-an-Numan by the crusaders was one of the five most important sieges of the First Crusade. Clearly, the capture of Nicaea, Antioch and Jerusalem was more significant and, accordingly, far more detail was devoted by the chroniclers to those three sieges than to that of Ma'arrat-an-Numan or 'Arqah but the position of those two sieges in the course of events was more prominent than that of many smaller positions that were captured by the advancing crusaders. As a result, though information is somewhat limited, there are a number of sections of the accounts of the siege of Ma'arrat-an-Numan that must be investigated. The siege ran from 28 November to 12 December.[113]

BUILDING OF EQUIPMENT BY THE CRUSADERS[114]

Raymond d'Aguilers:	Albert of Aachen, pp. 374-6:	Ralph of Caen, p. 674:
p. 166: ut si quatuor scalas plus habuissemus, capta esset civitas; sed quoniam non habuimus nisi duas, et illas easdem breves et fragiles, et timide super eas ascenderetur, consultum	Comes siquidem Reimundus, intelligens mala que suis circa urbem sedentibus ab insidiis Turcorum inferebantur, moleste accepit et hoc malum omnibus modis finire meditabatur. Vnde	alii machinas struunt, alii struentibus ministrant; hi *fundis balearibus* turres quatiunt, illi silices, instrumenta quassandi, scapulis apportant

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[112] T. Asbridge, *The First Crusade*, pp. 264-70; J. France, *Victory in the East*, pp. 311-15; H. E. Mayer, *The Crusades*, pp. 53; R. Rogers, *Latin Siege Warfare in the Twelfth Century*, pp. 39-45; S. Runciman, A History *of the Crusades*, I, pp. 259-60; C. Tyerman, *God's War*, pp. 149-40.

[113] H. Hagenmeyer, *Chronologie*, pp. 197-8, p. 201.

[114] William of Tyre includes this event in his account incorporating mention of artillery (*machinasque componunt iaculatoria*) but has no original information to offer; WT, p. 354.

est ut fierent *machinae* et crates et aggeres, quibus impelleretur murus et effoderetur et coaequaretur

p. 167: 'Interea, licett comparerentur quae supra diximus ad *oppugnandum machinae* tamen quidam de nostris videndo miseriam populi nostri et audaciam Sarracenorum, desperantes de Dei misericordia, sufugiebant.

Talamriam castellum in montanis situm aggreditur, quo in manu uirorum fortium expugnato et adtrito, cum Turcis in eo repertis, materiam lignorum de eodem castro attulit ex quibus *machinam* composuit ad superandam urbem predictam Marram, que muris et minibus munitissima erat. Facta autem *machina*, et ingeniis ordinates, urbs non post multum tempus superata, a comite et ceteris principibus Roberto et Tancredo et Eustachio capta deicitur

The information provided here by Albert of Aachen and Raymond d'Aguilers is vague at best. Neither explicitly mentions the construction of artillery at the start of the siege of Ma'arrat-an-Numan: rather they limit their descriptions to vague cover-all terms such as Albert's *machinam* and *machina* and Raymond's *machinae* and *oppugnandum machinae*. Ralph of Caen, on the other hand, makes it clear that some form of artillery was used. The term he applies to the machines employed at Ma'arrat-an-Numan is *fundae Balearia*. An unusual term in Ralph of Caen's work, *fundae Balearia* indicates that these machines are likely, but not certain, to have been some form of trebuchet, given the presence of slings in their apparatus. When one takes into account the nature of artillery references at a number of key points in the course of the First Crusade, it is clear that, if there were trebuchets used at the siege of Ma'arrat-an-Numan, they would have been trebuchets of the traction or hybrid variety rather than of the counterweight type.[115]

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[115] Traction trebuchets have been identified at a number of points in the course of the First Crusade: see above, 'Siege of Nicaea: The Aftermath of the Siege', pp. 131-133; above, 'Siege of Antioch: The Treatment of the Christians Within Antioch', pp. 148-152; below 'Siege of Jerusalem: Messenger/Spy thrown toward city', pp. 185-189. There is also some evidence of traction trebuchets at the 1147 siege of Lisbon, see below 'Siege of Lisbon: Organisation and Effect of the Artillery Crews', pp. 305-306.

The possible presence of trebuchets at this siege does not, of course, negate the possibility that other types of artillery also played a role in the siege efforts.

Gesta Francorum p. 404:	Raymond d'Aguilers, p. 173:	Peter Tudebode, pp. 91-2:	Baldric of Dol, pp. 84-5:	Guibert of Nogent, p. 252:	Robert the Monk, p. 846:	Ralph of Caen, p. 679:
fecit Raimundus comes de Sancto Egidio fieri quoddam ligneum castrum forte et altum. [...] Quod videns gens pagana, statim fecerunt *instrumentum* quo iactabant maximos lapides super castrum, ita ut paene nostros milites occiderent. Iaciebant quoque grecos ignes super castrum, putantes illud ardere et devastari. Sed Deus	Fiunt itaque post haec velociter scalae et turris lignea estruitur, et crates iunguntur, et terminata die pugna incipitur. At vero illi qui infra cititatem erant, in nostros, qui murum suffodiebant, lapides cum *tormentis*, et tela et ignem et ligna et alvearia cum apibus et calcem permixtim iaciebant.	Non port multum temporis fecit Raimundus Sancti Aegidii facere quoddam ligneum castrum nimis forte et valde altum. [...] Quod quum vidisset gens pagana, statim fecerunt plurima *instrumenta*, cum quibus iactabant immensos lapides supra castrum; ita quod pene nostros milites occidebant. Vexilla quoque quae sursum	Raimundus enim comes ligneam compaginari machinam fecit, [...] Admoverunt igitur struem illam propter quamdam turrem. [...] phalanges armatae circumvallabant moenia, *balistarii* et sagittarii spicula dirigebant, et qui in arce lignea erant, lapides immensos sursum iactitabant. [...] Wilhelmus de Monte Pislerio	Tum Sancti Egidii comes, suos cassum laborem cernens insumere, castrum quoddam ligneum multi robris ac proceritatis suis mandat erigere [...] Econtra urbani *baleare* celeriter edificant *instrumentum*, quo iactis ingentibus saxis nitebantur debilitare castellum, in tantum, ut frequens lapidum ictus et machinae dampnum et	Facta est et lignea turris lapideis turribus satis alitor, et machinis omnibus quae introrsus erant eminentior. [...] Sed miseri cives econtra fecerunt quoddam *instrumentum*, quo grandes lapides adversum turrim iaciebant, et etiam ignem Graecum, quo eam arderent, emittebant. Sed, Dei gratia protegente, omnes conatus eorum omnesque machinations	Igitur Marram usquequaque bello circumseptam soffodiunt, Marre supervolitant sagittae, concutiunt *fundae*, tremefaciunt minae: undique clamor, undique plaga: contra urbani quasi par pro pari reddunt, reverberant *balearica tormenta* similibus, missila jacula eminus, cominus vomeres marmora

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		demittunt

		nostris minaretur interitum. Iniectis quoque grecis ignibus super phalam moliebantur incendium, sed eorum dues super isto fefellit adnisum.	frustrate sunt et ad nihilum redactae. Nam turris lignea ubi muro proxima fuit, omnes qui in illa parte muri errant, ut sub se despiciens, prostituit.
erant perforabant cum sagittis et lapidibus; et alii ruebant graecos ignes super castrum, eo quod putabant illud ardere.	erat in machina, et alii multi. Et quoniam aedificium illud erat muris porrectius, facilius eis nocebant, utpote super quos lapides jaculati desursum ruebant. Percussi vero vel in ancilibus vel in galeis vel in capitibus,		

indifficulter oppetebant et omnimodis deficiebant. Habebant etiam uncinos ferreos, quibus sine intermissione infestabant alii alios. Turci nihilominus qui erant in turribus, Christianos sagittis et lapidibus impugnare; ignem, quem Graecum vocant, in machinam jacere, et nihil otiosum admittere.

omnipotens noluit ut castrum arderet hac vice; Supereminebat uero omnes muros ciuitatis.

The construction of a siege-tower by the crusaders and its use in an assault on the walls elicited a strong response from the defenders of Ma'arrat-an-Numan, which included the use of artillery in an attempt to halt and destroy the siege-tower. The account of Peter Tudebode is longer and slightly more detailed that that of the *Gesta Francorum* but at the crucial point, for the purposes of this investigation, when the *Gesta* describes the defenders' artillery by saying that *statim fecerunt instrumentum quo iactabant maximos lapides super castrum*, Peter Tudebode follows very closely in his account by writing that *statim fecerunt plurima instrumenta, cum quibus jactabant immensos lapides supra castrum*. The account of Robert the Monk is slightly further removed from that of the *Gesta* in terms of wording but still includes the term *instrumentum*: the account wrote of *instrumentum, quo grandes lapides adversum turrim jaciebant*. Guibert of Nogent follows the *Gesta Francorum* rather closely in including a reference to the artillery as *instrumentum* but also expands on this somewhat with the adjective *Balearis*. This problematic adjective has been discussed at a number of other junctures; its use seems to indicate a level of classical learning.[116] The important part of Raymond d'Aguilers' account, on the other hand, is his mention of the defenders *lapides cum tormentis... iaciebant*. Despite the accounts of the *Gesta Francorum*, Peter Tudebode, Baldric of Dol, Guibert of Nogent and Robert the Monk all being strongly related as part of the *Gesta* tradition of First Crusade narratives, there is nevertheless significant diversity in the terms used to describe what are clearly the same pieces of artillery. The *Gesta Francorum*, Peter Tudebode and Robert the Monk all use general terms to indicate the defenders' machinery whereas Raymond d'Aguilers is somewhat more interesting in that his account refers to *tormenta*. Baldric of Dol's account, another part of the *Gesta* family, presents some different information on the use of artillery in the course of this siege with reference to the use of *balistae* as well as the throwing of stones. The nature of the *balistae* reference is problematic and as it entails efforts by the attackers rather than the defenders, it is a distinct issue and, as such, it will be dealt with separately at the end of this case study. Baldric's description of the throwing of stones is vague, offering no specific terminology for the machines used and, in general, not expanding in any practical sense on the information presented in the *Gesta*

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[116] See above: 'Albert of Aachen', pp. 67-69; 'Guibert of Nogent', pp. 44-44; 'Ralph of Caen', pp. 71-73; '*De Expugnatione Lyxbonensi*', pp. 80-81.

Francorum. Finally, Ralph of Caen's account contains reference to both *fundae* and *balearica tormenta* at this siege. There is, therefore, quite a breadth and variety of terminology offered by the descriptions of this siege.

Turning first to the use of *tormenta* by both Raymond d'Aguilers and Ralph of Caen, the term is one with a classical as well as a medieval context.[117] The use of the term is sporadic throughout the First Crusade sources but in both Raymond d'Aguilers' *Historia Francorum* and Ralph of Caen's *Gesta Tancredi*, it is the most common term used to denote artillery. Raymond made seven clear references to artillery types in the accounts of six different incidents; the use of the term *tormenta*[118] means that references to such machines are more common than any other terms that include two uses of *petrariae* one reference to *balistaria* and two to *machinae impetus*.[119] Thus, it can be seen that Raymond had a very varied terminology from which it can be difficult to pick out the exact meaning intended. His use of the term *tormenta* is both further complicated and somewhat clarified by an incident in the course of the siege of Jerusalem.[120] In that incident he described what is certainly one artillery piece with two separate terms, first *petraria* and subsequently *tormenta*. This indicates that Raymond may have seen these terms as interchangeable though, as will be argued below, the term *petraria* would seem to fit rather well as a general term denoting a 'stone-thrower' without being specific. The evidence provided by this detailed account of artillery use at the siege of Jerusalem, in an event for which Albert of Aachen largely backs up Raymond's information, strongly suggests that traction trebuchets were in use at the siege of Jerusalem in 1099. It is important for the case study at hand to recognise the term employed by Raymond is the same at both junctures. There might be a suggestion,

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[117] R. Rogers, *Latin Siege Warfare in the Twelfth Century*, p. 256.

[118] Rd'A, pp. 173, 339, 342. Also see below, 'Siege of Jerusalem: Artillery Involvement in Siege-tower attack', pp. 194-209.

[119] Rd'A, pp. 200, 342; also see below, 'Siege of 'Arqah: Defenders' equipment', pp. 180-182 and 'Siege of Jerusalem: Artillery Involvement in Siege-tower attack', pp. 194-209. Rd'A, p. 19, also see above, 'Siege of Nicaea: Defenders' Artillery', pp. 117-119. Rd'A, p. 19, see above, 'Siege of Nicaea: Defenders' Artillery', pp. 117-119; Rd'A, p. 32, see above, 'Siege of Antioch: Strength of Antioch's Fortifications', p. 134-134.

[120] See below, 'Siege of Jerusalem: Messenger/Spy thrown toward city', p. 185-189.

therefore, that traction trebuchets were present and used by the defenders at the siege of Ma'arrat-an-Numan.

In Raymond's work the term *tormenta*, although marginally his most common artillery term, was not used in a widespread manner. Of the three uses of the term one is in this case at Ma'arrat-an-Numan and both the other two are in separate incidents at the siege of Jerusalem. There is therefore continuity in the usage of the term. It is quite possible, though not provable, that the use of the term twice at Jerusalem was referring to the same machine or set of machines. Thus there is no evidence to suggest that Raymond was using the term in a contradictory manner and it is distinctly possible that he had a clear idea of the system of terms he was applying to artillery throughout his account of the First Crusade. With this possibility of a conscious application of the term *tormentum* only at the technically appropriate parts of the First Crusade there is corresponding possibility that as well as identifying traction trebuchets at Jerusalem, they should also be recognised as making up part or all of the defenders' artillery pieces at the siege of Ma'arrat-an-Numan. That is not necessarily to say, however, that such artillery pieces were not used at other points in the course of the First Crusade; Raymond's accounts of artillery use are far from exhaustive and there are numerous events reported by other sources that do not appear in the *Historia Francorum* in which the appearance of traction trebuchets could be postulated.

Ralph of Caen's terminology is less varied. His work contains eight references to artillery, of which five utilise the term *tormentum* and the other three make use of the other term to appear in this extract, *funda*. His use of *funda* will be dealt with at the end of the case study as it details the measures employed by the attackers rather than the defenders of Ma'arrat-an-Numan. His use of *tormentum* would seem, on the surface, to provide a rare instance in which two of the major sources, in this case Ralph and Raymond, agree on the type of machine used and the appropriate terminology to describe those machines. This tempting possibility is not too unexpected, however, given that each of these authors employ the term *tormentum* more often than any other artillery term. They do not necessarily confirm one another, however, and more evidence than is available here would be

necessary to decide that their accounts were complementing one another in any such manner.

The artillery employed by the defenders had minimal impact on the advancing siege-tower and the attempt to capture the city was a success. This suggests that limited power should be accorded to the artillery of the defenders. As a result, if the suggestion that traction trebuchets were employed here were to be accepted, it should be realised that these machines were probably relatively small and that the crew operating the ropes of the machines are unlikely to have been large. There is an incident in the course of the siege of Lisbon where artillery pieces were described as being operated by one hundred people at a time.[121] Given this limited precedent, a similar number would perhaps be a suitable estimate for the size of the crew operating the artillery at Ma'arrat-an-Numan.

Indeed the throwing of rocks in an attempt to damage the siege-tower met with such limited success that the defenders also employed Greek fire to try damage the tower. In the *Gesta Francorum* and the associated sources mention of the throwing of Greek fire immediately follows a mention of artillery. It is put thus by the *Gesta Francorum*:

> Quod videns gens pagana, statim fecerunt instrumentum quo iactabant maximos lapides super castrum, ita ut paene nostros milites occiderent. Iaciebant quoque grecos ignes super castrum.

It is unclear if the Greek fire was thrown by machine or by hand but the placement of the reference to the Greek fire directly after the discussion of the *iactabant maximos lapides super castrum* and the use of the similar verbs to describe the action of hurling the two types of ordinance (*iactabant* for the *lapides* and *iaciebant* for the *grecos ignes*) suggest that the stones and the Greek fire shared a propulsion method.

Finally, as noted above, Baldric of Dol's account of the siege contains a reference to the use of troops armed with *balistae* by those attacking Ma'arrat-an-Numan. He wrote that these weapons were used to throw *spicula* or 'darts' at the

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[121] See below, 'Siege of Lisbon: Organisation and Effect of the artillery crews', pp. 305-306.

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city's defenders. This is not a reference to artillery, however. Identifying these weapons as crossbows fits the context of the use of the word *balista* far better than artillery would. That these weapons are detailed as firing the same missiles, *spicula*, as the archers (*sagittarii*) is important. *Spicula* could, of course, vary in size and the appearance of the word should not immediately be taken as an indication of the presence of crossbows rather than artillery pieces. Despite that, the fashion in which the missiles fired by both these two types of soldier, archers and those operating the *balistae*, were described by the same word with no apparent differentiation suggests that they were firing identical or almost identical missiles. Thus an identification of crossbows would fit, since archers would find it difficult to fire the spear-like size of 'darts' that a full sized artillery *balista* would have fired. Moreover, these weapons are mentioned in the context of the *phalanges* that surrounded the walls of the city. This may contain a suggestion that these weapons were operated by mobile foot-soldiers who were able to move in and surround the walls of Ma'arrat-an-Numan – not an action as easily achieved by artillery as by foot-soldiers carrying crossbows (although, it must be noted, not an impossible task for an artillery crew). Baldric's use of the term *balistae* elsewhere must also be taken into account. There is an occasion during the siege of Antioch where he used the term in such a fashion for it to be clearly an artillery term.[122] This precedent for Baldric using *balistae* to indicate artillery confuses any possible conclusion on the typology of the weaponry concerned. While the evidence from this incident alone suggests that it may be prudent to consider these as crossbows rather than artillery pieces to say so conclusively would go against the evidence available elsewhere in Baldric's narrative. If this were an artillery piece it would be a very significant passage in Baldric's work as the machine in question is depicted as projecting *spicula* rather than stones and, as a result, would almost certainly be a reference to a classical *balista*. That tantalising conclusion must remain conjectural, however, given the less than certain nature of the passage.

In a separate description of machines being used by the crusaders in conjunction with their siege-tower assault, Ralph of Caen wrote of the use of *fundae*. There is no further evidence as to the effectiveness of these machines

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[122] BD, p. 54; also see above 'Siege of Antioch: Bohemond's Speech', pp. 152-153.

except to say that the stones they threw hit the walls. This lack of dramatic effect is as expected for artillery in the First Crusade. The presence of slings as part of these machines may indicate that they were some form of trebuchet but, given the paucity of the evidence, it is a tenuous link.

SIEGE OF 'ARQAH (1099)[123]

Due perhaps to the eventual failure of the military activities at 'Arqah, the crusade chroniclers avoided ascribing too much significance to the town's siege. Consequently, it is a siege for which little information is available. The lack of success made it a relatively unimportant event for the crusade authors who had many successes and moments of divine intervention to recount and, thus, chose not to dwell on the failed siege of 'Arqah. As well as making little progress toward a successful conclusion, the siege was at the same time hampering the advance toward Jerusalem so it was abandoned after an investment of three months.[124] The lack of clear accounts of the chronology of the siege leave the modern reader with only two clear events involving artillery during the siege: descriptions of the machines that were built by the crusaders at the outset of the siege and accounts of the defenders' actions to beat off crusader assaults. The city later fell to crusader hands in 1108.[125]

CRUSADER EQUIPMENT

Albert of Aachen, p. 376:	Robert the Monk, p. 853:	Guibert of Nogent, p. 264:	Ralph of Caen, p. 680:
Ibi tandem machinas fecerunt et *instrumenta*	Saepius illos invaserunt omni genere telorum et	cum de turre subruenda universa opera frustra	principes de more *tormenta* muralia struunt: singuli

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[123] T. Asbridge, *The First Crusade*, pp. 282-94; J. France, *Victory in the East*, pp. 317-23; H. E. Mayer, *The Crusades*, p. 54; J. Riley-Smith, *The Crusades*, p. 42; R. Rogers, *Latin Siege Warfare in the Twelfth Century*, pp. 45-7; S. Runciman, A History *of the Crusades*, I, pp. 270-5; C. Tyerman, *God's War*, pp. 150-2.

[124] H. Hagenmeyer, *Chronologie*: arrival of Crusaders at 'Arqah on February 14, 1098, p. 216; end of the siege, May 13, 1098, p. 230.

[125] See below, 'Siege of 'Arqah (1108)', pp. 261-263.

mangenarum, moles lapidum in impetu iactantium per turres et antiqua muralia, quibus onclusos milites eiusdem presidia absterrerent et effugarent. Sed eos defensores indefessos et inuictissimos repererunt	*tormentorum,* et non praevaluerunt; sed magis quam lucrarentur perdiderunt	cessisset um Ansellus de *balistarum* apparatibus nostris commoniorium suggerere curavit. Quibus institutes et creba lapidum missione turrem vexantibs, ecce et obsessi similia e regione instaurant.	singula, unum comes Normannus, alterum Raimundus, tertium Tancredus

What can be observed in this case study is the construction, organisation and use of artillery during the siege of 'Arqah as well as an interesting concurrence of terminology across two diverse sources. Looking first at the testimony of Albert of Aachen, his terminology in this case follows his overarching preference of referring to artillery pieces as *mangene*. Apart from his reference to *instrumenta mangenarum*, he also has an interesting description of *moles lapidum in impetus oactantium per turres et antiqua muralia*. This is a rare reference to the preparation or gathering of piles of stones to supply crusader artillery. Although it is common sense that those operating stone throwing machines would be constantly looking for and gathering stones to fire there is little direct reference to this important practice. The reference here goes someway to confirming that there was crucial planning and military organisation in the crusader camp during this siege and, most likely, others.

The *Gesta Francorum* does not give any detailed information on the siege of 'Arqah except for some information on ancillary events around the same time and for a partial list of the dead of the siege. This list provided by the *Gesta Francorum* includes Anselm of Ribemont who, through his letters, was one of the sources for the crusade. Robert the Monk and Ralph of Caen both use the term *tormenta* to describe the artillery pieces constructed by the crusaders at the siege of 'Arqah: the agreement of terminology across two quite separate sources is very interesting and worthy of note and discussion. Based on the context of certain references to military equipment in Robert the Monk's *Historia Iherosolimitana*, it has been suggested

previously that there is some doubt when dealing with those military descriptions in Robert the Monk's work that are not based on evidence from the *Gesta Francorum*. This is one of those cases but, in contrast to other examples discussed already, the terminology used by Robert the Monk in this case is directly backed up by that visible in another, independent source.[126] Both the phrasing and some of the information included in the two sources differ from one another further increasing the certainty that there is no connection between the two sources. Robert the Monk referred to the failure of the *genere telorum et tormentorum* in the course of the siege, while Ralph of Caen's disussion of artillery centred on their construction and the fact that the *comes Normannus*, *Raimundus* and *Tancredus* each built one.

It could be argued of course that, given the number of references to artillery across the sources of the First Crusade, such a coincidence of terminology was inevitable and, with that in mind, it is important not to read too much into the concurrence of terminology, especially given Robert the Monk's track record for unreliability regarding military terms. The use of *tormenta* in Robert the Monk's *Historia Iherosolimitana* shows an interesting pattern. Robert refers to what are likely to be artillery pieces at six points in the course of his work: four of these use the term *balistae*, two use the term *tormenta* and one use of *instrumentum* to refer to artillery.[127] One of those references to *balistae* also has reference to *fundae*.[128] Thus, he uses three terms for artillery over the course of the account. All the references to *balistae* come between the sieges of Nicaea and Antioch while for the siege of 'Arqah, in which both the other references appear, he instead refers to *tormenta*. As a result, there is a possible nomenclature system at work in the *Historia*

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[126] See above, 'Siege of Nicaea: Construction of Equipment by the Crusaders on Ascension Day', pp. 108-110; 'Siege of Nicaea: Heads Thrown into the City', p. 119-124.

[127] RM, p. 756, see above, 'Siege of Nicaea: Construction of Equipment by the Crusaders on Ascension Day', pp. 108-110; RM, p. 757, see above, 'Siege of Nicaea: Heads Thrown into the City', pp. 119-124; RM, p. 775, see above, 'Siege of Antioch: Building of Equipment by the Crusaders', p. 134-137; RM, p. 777, see above, 'Siege of Antioch: Turkish heads thrown over the walls', p. 144-145. RM, p. 376, see below, 'Siege of 'Arqah: Defenders' equipment', p. 180-182; the second reference is the one at the beginning of this section. RM, p. 846, see above, 'Siege of Ma'arrat-an-Numan: Defenders' machine to attack siege tower', pp. 167-174.

[128] RM, p. 757, see above, 'Siege of Nicaea: Heads Thrown into the City', p. 119-124.

Iherosolimitana in which the shift from *balistae* to *tormenta* occurred between Antioch and 'Arqah. It must be asked whether Robert the Monk had a reason for making this change in his terminology? Ralph of Caen also made six references to artillery in his *Gesta Tancredi* but his terminology does not follow a pattern similar to that of Robert the Monk. In four of his six references to artillery Ralph of Caen made use of the term *tormenta* or a variant, while in the other two references the phrases *fundae balearia* and *fundae balearis turbine* were used.[129] Given Ralph's frequent reference to *tormenta* in the later stages of the crusade, the appearance of the same term at the same time by two different sources is not a surprising coincidence. Rather, it is Robert's switch in terminology away from the term *balistae* that is most intriguing here. Does the change suggest a change in the types of artillery being constructed and employed by the crusading force at some point following the capture of Antioch? Albert of Aachen has a less stark change in terminology in that the term *balista* appears on three occasions before the siege of Ma'arrat-an-Numan but not at all in the sieges of Ma'arrat-an-Numan, 'Arqah or Jerusalem.[130] It needs to be explicitly pointed out that in both Albert of Aachen and Robert the Monk the switch is away from use of the term *balista*. It is unfortunate, however, that, as Robert the Monk does not have any references to artillery in the sieges of Ma'arrat-an-Numan or Jerusalem, the source does not allow for a more complete examination of a long and complete sequence of terms, as is possible with the more complicated terminology of Albert of Aachen. This issue of the systems of nomenclature employed by the various sources is one which is dealt with elsewhere.[131] For the purposes of this case study it needs merely to be noted that the term *tormenta* and its appearance in two sources simultaneously presents some interesting issues but that, given the problems associated with Robert the Monk as a military source, conclusions that might have been drawn from the coincidence must remain tantalising possibilities rather than certain verdicts.

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[129] RC, pp. 674, 692.
[130] See below, 'Appendix: Albert of Aachen's Artillery Nomenclature', pp. 325-343.
[131] See above, 'Section 1, Primary Sources: Background and Nomenclature: Chroniclers of the Early Crusades, 1096-1148', pp. 14-92; also see below, 'First Crusade Case Studies: Conclusions', p. 214-232.

Leaving the exact terminology to one side, this event is also informative regarding other areas of artillery use during the First Crusade. Ralph of Caen's revelation that three *tormenta* were constructed, one each by *comes Normannus*, *Raimundus* and *Tancredus*, shows the ability of these leaders to construct artillery pieces in large numbers was limited. Count Raymond of Toulouse especially was an important man with significant resources and the siege of 'Arqah was not brief, lasting from 14 March to 13 May 1099, a total of two months allowing ample time for the construction of machines.[132] Unless there was a severe shortage of material available, which is not reported directly in the course of the siege of 'Arqah, the leaders involved should have been able to bring significant resources to bear on 'Arqah and in the prosecution of the siege. Thus the apparently small number of *tormenta* constructed by the crusaders is important as it leads to the deduction that the *tormenta* were probably difficult to construct and operate. There are a number of possible conclusions that might be drawn from this. The term *tormenta* has already been linked to the traction trebuchet, through the work of Albert of Aachen.[133] If this were taken to be the form of the machines in question here, then manpower might have been an issue in the operation of the equipment. Having enough men to organise them in shifts of a significant size to create powerful machines would have required a large body of able troops. Manpower was not a problem on the crusade but if each leader was using only his own men then perhaps manpower was a limiting factor, especially if the leaders in question required their men to carry out other siege actions in addition to the operation of artillery. In the siege of Lisbon in 1147, a battery of probable traction trebuchets was built and operated thus:

> Insuper due *funde Balearice* a nostris eriguntur, una supra ripam fluminis a nautis trahebatur, altera contra portam ferream a militibus et eorum convictualibus. Hii omnes per centenos divisi, audito signo exeuntibus primis centenis, alii centeni subintrassent, ut inter decem horarum spatia V. milia lapidum iactarentur.[134]

In the detailed account of the siege of Lisbon the *milites* involved in the operation of the artillery can be seen to have been organised into groups of one hundred which rotated and allowed for a constant operation of the two *fundae Balearia* that

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[132] H. Hagenmeyer, *Chronologie*, pp. 222, 230.

[133] See above, 'Siege of Ma'arrat-an-Numan: Defenders' machine to attack siege tower', pp. 167-174.

[134] *De Expugnatione Lyxbonensi*, ed. C. W. David, p. 142.

had been set up. The author of the *De Expugnatione Lyxbonensi* also saw fit to note that in the course of ten hours the two artillery pieces fired five thousand rocks at the defenders of Lisbon. These, probably apocryphal, numbers would indicate that each *funda* would have fired two thousand rocks in ten hours or two hundred and fifty an hour. That would work out to a rate of just over four rocks a minute or one rock approximately every fourteen seconds. Even if the actual rate-of-fire were only half what the *De Expugnatione Lyxbonensi* reported then to maintain such a rate would have require a significant investment of men to ensure that shifts operating the machine were short enough to avoid exhaustion and that each crew was large enough to propel the rocks with sufficient force to present a realistic threat of damaging the defences or defenders.

There are several other possible forms that these *tormenta* might have taken. The chance that these were counter-weight trebuchets is limited. There is not sufficient evidence to postulate the existence of the counter-weight trebuchet in the first half of the twelfth century, let alone in the late eleventh.[135] The small number of machines constructed at the siege would fit with the nature of the counter-weight trebuchet in that it required a significant investment of high quality materials and the expertise to construct and operate but that type of machine does not fit with the impact of the machines in question, which was negligible.[136] Robert the Monk reported that *tormenta* at the siege *non praevaluerunt*. The classical artillery types of the *onager* and *balista* need to be considered here; both could quite possibly have

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[135] This has not, however, prevented historians from trying. There are various sieges that have been nominated as the first at which there is evidence for the appearance of the counterweight trebuchet or as early examples of the use of those machines. These include Nicaea (1097; P. E. Chevedden, 'The Invention of the Counterweight Trebuchet', pp. 76-86), Lisbon (1147; J. Bradbury, *The Medieval Siege,* p. 260), Tortona (1155; D. Nicolle, *Medieval Siege Weapons, Western Europe*, p. 19); Zevgminon (1165; K. DeVries, *Medieval Military Technology* (Ontario, 1998), p. 138); Castelnuovo Bocca d'Adda (1199; K. Huuri, 'Zur Geschichte des mittelalterlichen Geschützwesens aus orientalischen Quellen', *Studia Orientalia* 9, 3 (Helsinski, 1941), p. 64 and Chevedden, 'The Invention of the Counterweight Trebuchet', p. 76).

[136] Richard I saw fit to transport probable counter-weight trebuchets from Cyprus to Acre for the siege of that city in 1191 (For the reassembling of artillery pieces see: Bradbury, *The Medieval Siege*, p. 125). This would seem to point to the requirement of high quality materials that could not be expected to be present everywhere. It also points to the cost of producing such machines and the necessity not to merely use them in one limited campaign but to get as much use from them as possible.

been present at this siege. *Balistae* have, due to the appearance of the term in clusters in the accounts in the course of the earlier sieges of the First Crusade, been postulated at some points in the First Crusade but there are some objections to arguing for the presence of a bolt-throwing *balista* in the form of large crossbow here. The presence in Albert of Aachen's account of a reference to *moles lapidum* combined with the lack of any evidence to suggest a diversity of types in the battery of machines at 'Arqah would suggest that the crusader artillery pieces consisted of stone-throwing machines and did not include *balistae* in the form in which it was understood in late Antiquity and the Middle Ages, that of a large crossbow which fired bolts. The reference to *moles lapidum* does not, on the other hand, rule out the one-armed stone-throwing device that was the *onager*.

The two main possible forms remaining that were most likely to have been present at 'Arqah in 1099 are, therefore, the *onager* and the traction trebuchet. There is not enough direct evidence to conclusively state what type of machine was present but it could be argued that, perhaps, the necessity for large numbers of men to operate traction trebuchets proffers the best of the available explanations for the small numbers of machines constructed.

DEFENDERS' EQUIPMENT

Raymond d'Aguilers, pp. 200-1:	Albert of Aachen, p. 376:	Guibert of Nogent, p. 264:	Robert the Monk, p. 857:
Praeterea tantos actales milites ibi perdidimus quod relatu gravissimum est. Interfectus est ibi dominus Pointus de Balduno, cum lapide de *petrariis*	De intus namque simili iactu *mangenarum et impetu lapidum* resistebant, et damnum gentis Christiane tam sagittis quam lapidibus faciebant. Anselmum de Monte Riburgis, uirum	cum de turre subruenda universa opera frustra cessisset um Ansellus de *balistarum* apparatibus nostris commoniorium suggerere curavit. Quibus institutes et creba lapidum missione turrem vexantibs, ecce et	Similiter ibi mortuus est Pontius Balonensis, cujus tempora perforavit ictus lapidis *tormento* jaculati.

nobilissimum et bellicosum, multam uim defensoribus arcis inferentem, impetus saxi ab eadem arce uolantis fracto cerebro precusserunt.	obsessi similia e regione instaurant. *Machina* itaque erecta et ingentia in nostros saxa torquente, ad maximim totius Francorum exercitus dampnum Ansellus isdem aut primus aut inter primos ipse percutitur.

Agreement between Albert of Aachen and Robert the Monk make it immediately clear in this instance that the artillery employed by the defenders of 'Arqah were stone-throwers. Albert of Aachen refers to *mangenarum et impetu lapidum* whereas Robert the Monk refers to *Pontius Balonensis* being killed by a blow to the head by *ictus lapidis tormento jaculati*. Raymond d'Aguilers also refers to the death of *Pontius* during the course of this siege, *cum lapide de petrariis*; his account goes a step further than that of Robert the Monk when he describes the artillery piece that killed *Pontius* as a *petraria*. A similar fate to that of *Pontius Balonensis* befell *Anselmus de Monte Riburgis* and was recorded by Albert of Aachen but without a direct reference to the type of machine that threw the fatal *saxum*. The death of Anselm is confirmed in the *Gesta Francorum*.[137] By referring to the *simili iactu* of the artillery, at the start of the extract, Albert of Aachen was likening the defenders' artillery to that used by the crusaders, which is discussed in the section directly above. This could be argued to be a statement by Albert that the defenders of 'Arqah were using the same type of artillery as the attacking crusaders; indeed there is a clear continunity regarding terminology throughout the siege of 'Arqah in both sources presented here. Albert of Aachen used the term *mangene* to describe both the crusaders' and defenders' artillery whereas Robert the Monk used *tormenta*. Although these examples do not have continuity in terminology across source there is internal continuity in both of these accounts of the sieges. This would support the argument that there is a strong possibility that the crusaders and the defenders of 'Arqah were using the same or very similar forms of artillery in the siege of that city.

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[137] GF, p. 435.

The identification in the previous case study of traction trebuchets or onagers is thus more significant, as whatever type of artillery was in use by the crusaders at 'Arqah seems also to have been employed by the defenders. There is little here unfortunately to further support the deductions made in the previous section and the conclusion that the crusaders' artillery was perhaps slightly more likely to have consisted of traction trebuchets than onagers, applies to the defenders too.

ARRIVAL OF CRUSADERS AT LYDDA[138]

Albert of Aachen, p. 638:

... exercitus Babylonie innumerabilis et numquam ante copiosior factus, ab Ascalona alii nauigio, alii per aridam in equis et copioso apparatus armorum descendentes, tempulum sancti Georgii, distans miliario a ciuitate Ramnes, combusserunt...

William of Tyre, p. 373:

Cuius ecclesiam, quam ad honorem eiusdem martyris, pius et orthodoxus princeps Romanorum augustus, illustris memoriae dominus Justinianus multo studio et devotione prompta aedificari praeceperat, audito nostrorum adventu, solotenus hostes dejecerant paulo ante, timentes ne trabes ecclesiae, quae multae proceritatis erant, in machinas et *tormenta* ad expugnandam urbem vellent convertere.

Both Albert of Aachen and William of Tyre mention the destruction of the chapel of St. George at Lydda but it is only William who gives a reason for its destruction. He states that the chapel had been demolished so that its beams could not be used to build *tormenta*. There is a sense in which this could be seen as evidence for the type of machines the crusaders were building – the use of beams could possibly be taken as evidence for lever artillery utilising long arms. That cannot be relied upon, however, as it is possible that the wood would have been cut

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[138] T. Asbridge, *The First Crusade*, pp. 298-319; J. Bradbury, *The Medieval Siege*, pp. 114-6; J. France, *Victory in the East*, pp. 325-66; Mayer, *The Crusades*, pp. 55-6; Riley-Smith, *The Crusades*, p. 43; R. Rogers, *Latin Siege Warfare in the Twelfth Century*, pp. 47-63; S. Runciman, A History *of the Crusades*, I, pp. 278-88; C. Tyerman, *God's War*, pp. 153-9.

up and used in smaller parts for the construction of *tormenta*. As a result, there is little that can be taken from this about artillery typology or morphology. What can be seen is an example of the *ad hoc* nature of the crusader siege train, such as it was. The First Crusade armies did not have organised logistical support to back up their poliorcetics endeavours. The problematic nature of William's account of the First Crusade must also be borne in mind; it has been shown that, on occasion, military information pertaining to the early years of his *Historia* and unique to that account must be treated with caution.[139] As there is no other account that provides the same reason as William does for the destruction of the church, it cannot be safely accepted that that reason is accurate.

SIEGE OF JERUSALEM (1099)[140]

The relatively short siege of Jerusalem saw the crusader assault centre on the use of siege-towers at two separate points of the city's walls. The city, formerly in Artukid Turkish hands, had been besieged and captured by the Fatimids in August 1098, a mere year before the crusaders arrived before the walls.[141] Albert of Aachen's *Historia* contains a brief account of this siege, recording:

> Nunc, ut Nicaem ordinatio, idem rex Babylonie, audita Gloria, uirtute ac uictoria Christianorum principum et Turcorum humiliatione in urbe Ierusalem quam amierat trecentos Turcos in apparatu et exercitu copioso obsedit, quos plurimo assultu ac mangenarum impetus expugnatos fatigauit, multum obsistentes ac repugnantes, sed non sine magno detrimento.[142]

Any repairs to the city's defences that were necessary following this assult with *mangene* seem to have been made by the time the crusaders arrived almost a year

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[139] See above, 'William of Tyre', pp. 85-86.
[140] T. Asbridge, *The First Crusade*, pp. 298-319; J. Bradbury, *The Medieval Siege*, pp. 114-6; J. France, *Victory in the East*, pp. 325-66; C. Kostick, *The Siege of Jerusalem, Crusade and Conquest in 1099* (London and New York, 2009); H. E. Mayer, *The Crusades*, pp. 55-6; J. Riley-Smith, *The Crusades*, p. 43; R. Rogers, *Latin Siege Warfare in the Twelfth Century*, pp. 47-63; S. Runciman, A History *of the Crusades*, I, pp. 278-88; C. Tyerman, *God's War*, pp. 153-9.
[141] J. France, *Victory in the East*, p. 333.
[142] AA, p. 442.

later in 1099.[143] The crusader assaults on the walls, though focused on the use of siege-towers, utilised significant amounts of artillery support and, consequently, the siege of Jerusalem provides some very rich detail concerning the nature of artillery use in this period.

BUILDING OF EQUIPMENT BY THE CRUSADERS[144]

Gesta Francorum, pp. 461-2:	Albert of Aachen, p. 408:	Guibert of Nogent, p. 275:	Ralph of Caen, p. 691:
Tunc seniors nostri ordinaverunt, quomode ingeniare possent civitatem, ut ad adorandum nostri Salvatoris intrarent Sepulcrum. Feceruntque duo lignea castra, et alia plura *machinamenta*. Dux Godefridus suum decit castrum cum machinis, et Raimundus comes similiter, quibus de longinquis terries attrahebant ligna. Saraceni igitur uidentes nostros facientes has machinas, mirabiliter muniebant ciuitatem, et turres nocte accrescebant.	Crastina uero luce primum terries inmissa, uniuersi artifices operi machine, *mangenarum* et arietis instant, alii securibus, alii terebellis, quousque sub spacio quatuor ebdomadarum opus machine, arietis et *mangenarum* ad unguem perductem est ante turrim Dauid in aspectu omnium qui eodem perductum morabantur	Preter alia ergo plurima instrumenta, quibus aut muri per arietum illisiones labefactarentur aut crebris *balistarum* iactibus turres concuterentur ac menia, duo iubent institui lignea castra, quae nos sumus soliti vocare 'phalas'.	Consummatum est opus, *tormenta* fabrefacta, exstructae machinae, parata onnia quae praesentis instantia necessitates postulabat

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[143] J. France, *Victory in the East*, p. 334.

[144] William of Tyre includes this event in his account, incorporating mention of artillery (*machinas iaculatorias, quas mangana vel petrarias vocant*). Although his terminology differs slightly from that of the other sources for this event, he has no original information to offer; WT, p. 393.

These accounts of the construction of siege equipment at the start of the siege of Jerusalem include three separate mentions of artillery. Ralph of Caen's account speaks of *tormenta fabrefacta* while Albert of Aachen includes *mangene* among a list of pieces of equipment constructed, which also included *machinae* and *arietes*. Furthermore, Guibert of Nogent wrote of the use of *balistae*. The *Gesta Francorum*, on the other hand, both referred to the *plura machinamenta* that were built as well as clearly identifying the construction of the siege-towers that were central to the assault by listing *duo lignea castra* as having been constructed. Crucially, however, the *Gesta* did not give any direct mention of artillery in this section. It cannot be doubted that artillery was constructed at Jerusalem in 1099, given the testimony of the other sources, but from the language of the *Gesta Francorum* the implication is clear that the *duo lignea castra* were the main pieces of equipment constructed. Artillery, being merely included in the general phrase *plura machinamenta*, was not of primary importance.

Albert of Aachen's uses of the term *mangene* in other cases in the course of the First Crusade strongly suggest that these are best treated as stone throwing machines.[145] There is a similar connection to stone-throwing associated with *tormenta*, which Ralph of Caen mentions here, but that link is weaker in this particular instance as the evidence for it does not come from Ralph of Caen's own narrative but from that of Albert.[146] There is also some evidence in the terminology to suggest that these terms may refer to traction trebuchets but this will be examined in more detail in the following case study.

MESSENGER/SPY THROWN TOWARD CITY

Peter Tudebode, p. 107:

Quadam die miserunt Sarracenum quemdam ad videndum cujusmodi ingenia Christiani faciebant. Suriani

Albert of Aachen, pp. 420-2:

...duo Sarraceni ab Ascalona properantes et regis Babylonie nuncia defensoribus urbis deferentes iam noctis silentio

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[145] AA, p. 112; see also above, 'Siege of Nicaea: Count Raymond's Artillery Assault on a Mural Tower', pp. 124-125.

[146] *Ibid.*; AA, p. 110, see also above, 'Siege of Nicaea: Construction of Equipment and Attacks on the City following the Battle', pp. 113-117.

vero et Graeci videntes illum esse Sarracenum, indicaverunt eum Christianis dicentes: 'Ma te Christo caco Sarrazin!' Quod sonat in nostra lingua: 'Per Christum hic est ignavus Sarracenus'. Quem Christiani apprehendentes, interrogavernt per drogomundum, scilicet per interpretem, ad quid venerat. Qui respondens ait: 'Sarraceni me huc miserunt, volentes scire cujusmodi essent ingenia vestra.' Cui respondentes Christiani dixerunt bonum esse, atque eum acceptum, ligatis manibus ac pedibus, posuerunt eum in funda cujusdam ingenii, quod *petrera* vocatur, ataque cum omnibus viribus suis cogitates eum projicere infra civatem, nequiverunt. Nam cum tanto impetu veniit, quod, ruptis vinculis, antequam ad muram pervenisset civatatis, dilaceratus est.

incumbenti in medio custodum uenientes astiterunt, urbem sine aliquo obstaculo ingredi sperantes. Sed subito a militibus et custodibus porte inobsesse capti et retenti sunt. ... Post hanc et ceteras relationes militibus restitutus, *tormento* cuiusdam *mangene* ligatis manibus et pedibus est inmissus ut sic post primam et secundam inundationem trans muros iactaretur. Sed nimio corporis euis pondere *pellis mangene* grauata, non longe miserum proiecit. Qui mox iuxta muros corruens super asperos siciles, fractis ceruicibus, neruis et ossibus, in momento extinctus fuisse refertur.

There are several crucial points to be taken from this incident but, first, it must be noted that there are significant problems associated with the artillery terms used in these extracts that make them awkward to intrepret. As has been pointed out already, the use of the term *mangene* in Albert of Aachen's *Historia Ierosolimitana* is too general to be directly helpful in identifying typology. It is difficult to know if Albert meant it in a specific way or if he was merely using it as a general word to denote artillery.[147] Peter Tudebode's account presents a different problem in that, as most of it is extremely close to the *Gesta Francorum*, this is the only artillery reference that is unique to his work and not drawn from the *Gesta*. It is impossible, therefore, to identify patterns and to be able confidently to pinpoint a system of terminology in Tudebode's *Historia*.

As a result of the myriad of problems associated with medieval artillery terminology, the cases that are vital to the identification of artillery typology in the crusades are those, such as this one, that possess significant amounts of ancilliary information about the operation of artillery. There are some discrepancies between the two accounts presented here of what is clearly the same incident. In the version

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[147] See above, 'Albert of Aachen', pp. 59-60.

presented by Albert, two messengers were sent from Ascalon to the defenders of Jerusalem but were captured by a crusader ambush that had been laid to catch such messengers. One of them was killed in a struggle, leaving one to be interrogated and executed in the manner described by both narratives. The introduction to this incident in Albert's account is in distinct contrast to that presented by Tudebode, who wrote that only one spy was involved and that he had been sent from inside the city to investigate the machines being constructed by the crusaders. Combined with a knowledge of the history and background of the two accounts, this dichotomy in the introductions to the execution of the spy further indicates that these are two very independent sources.[148] Their disagreement in points only serves to highlight the elements on which they agree and that agreement occurs regarding most of the information about artillery provided by this incident.

Albert of Aachen's account mentions the soldiers placing the unfortunate spy in the *pellis mangene*. The use of such a term indicates the presence of a sling in the working of the artillery piece. Slings were not generally used in classical artillery pieces such as the onager or the *balista* and the appearance of a reference to a sling has been flagged as a strong indicator of the presence of a trebuchet.[149] From the evidence of the presence of a sling in the working of this artillery piece, it is probable that the artillery in use here were trebuchets of some sort, so that it remains to decipher which kind was in use. There are two main parts of the accounts that would suggest that the spy was propelled to his death from a traction or hybrid trebuchet. The first of these is the fact that both sources agree that the spy did not reach the walls of the city. If a counterweight trebuchet had been in use, there is a much higher chance that such a machine would have had the necessary power to propel a man the required distance to reach the walls. Indeed it is estimated that, at the full capacity of their depicted boxes for carrying a counter-weight (some thirty tons), the counter-weight trebuchets depicted by Villard de Honnecourt in his thirteenth-century portfolio of drawings could fire missiles of 100 kilograms over 400 metres.[150] At half the weight of the counterweight (about fifteen

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[148] See above, 'Albert of Aachen', pp. 57-59, and 'Peter Tudebode', pp. 20-23.
[149] J. Bradbury, *The Medieval Siege*, pp. 266-7.
[150] P. E. Chevedden, 'The Invention of the Counterweight Trebuchet', p. 72.

tons) a 100-kilogram projectile could be fired about 217 metres.[151] Similarly, Phillippe Contamine calculates that a counterweight trebuchet with a ten ton weight could throw a 100-150 kilogram missile approximately 150 metres in contrast to Roman artillery pieces, which could throw missiles weighing 20-30 kilograms about 225 meters.[152] An average man would come in at a weight significantly less than 100 kilograms and so could in theory have been thrown upwards of 400 metres towards and over the walls of Jerusalem. Even the figures when the counterweight was halved in size are impressive and an 80 kilogram man could be propelled something approaching a quarter of a kilometre.

The most likely conclusion to be drawn from the fact that both these sources say that the spy did not reach the walls of the city is that the crusaders' artillery piece did not have enough power to fire missiles weighing more than a man over a long enough distance. Thus, the missiles fired through the siege would have weighed less than that man. This would mean that the rocks thrown by the Christian artillery were not in the size range calculated to be possible for bona fide and fully developed counterweight trebuchets from later periods such as those depicted by Villard de Honnecourt in the early thirteenth century.

The fact that these machines were firing missiles weighing less than those fired by later counterweight trebuchets does not completely rule out the possibility that these were of the counterweight variety. If this incident at Jerusalem did involve counterweight trebuchet, it would have been one that appeared when that type of machine was in a developmental phase. Thus lack of power cannot be seen as conclusive evidence to declare this a traction or hybrid trebuchet as it could be argued as merely showing a siege-engine yet to reach its full potential or one not employing a sufficiently large counter-weight.

More evidence is, therefore, necessary to be able to confidently assert that the machine which fired the captured spy towards Jerusalem, was a traction or hybrid trebuchet. Such evidence comes from Peter Tudebode. He described the attempt to send the spy over the wall thus: *cum omnibus viribus suis cogitates eum*

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[151] *Ibid.*

[152] P. Contamine, *War in the Middle Ages*, trans. M. Jones (Oxford, 1984), p. 103.

projicere infra civatem. This statement is the crux of the matter: it shows that there was human strength involved in the action of the *petraria* used in this incident. The reference to the use of *vis* or 'strength' in the projection of the unfortunate captive and the mention of the *Christiani* acting 'with all their strength', points to presence of physical strength in the working of the machine; a counterweight trebuchet did not need human force to propel its missiles. The requirement of the application of physical strength by an unspecified number of troops directs us towards either a traction trebuchet or a hybrid trebuchet as that which was being used in this event. To make such a distinction, however, it will also be necessary to examine what these machines were used for during the siege as a whole, as this will give us further information on the power and effectiveness of the artillery and will also aid in pinpointing the exact typology of these machines. Such an examination will be conducted following the case studies being investigated in this section.[153]

This event is one that has been flagged elsewhere as important in the identification of trebuchets in the period. Rogers has pointed to Peter Tudebode's version of the event as evidence that in about 1110, approximately when Tudebode's account was written, the author and the intended readers of his text were already familiar with the idea and mechanics of lever artillery, trebuchets.[154] The identification by Rogers of lever artillery in the extract from Peter Tudebode quoted here tallies well with the conclusions being reached here but his examination of the incident does not go far enough. His brief use of the event to illustrate a point omits reference to Albert of Aachen's account and he only uses it to reach conclusions about the period in which Peter Tudebode wrote, rather than about the incident he was writing. The presence of a notably similar account in an independent version of events, that of Albert of Aachen, suggests that more can be concluded about the artillery in use during the siege than the conclusions reached by Rogers. The agreement of the two sources strongly suggests that not only were these machines familiar to the authors and readers at the time that the accounts were written but that there were traction trebuchets at the siege of Jerusalem in 1099.

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[153] See below 'First Crusade Case Studies: Conclusions – The Tactical Application of Artillery', p. 228-232.
[154] R. Rogers, *Latin Siege Warfare in the Twelfth Century*, p. 265.

Gesta Francorum, pp. 462-3:	Raymond d'Aguilers, pp. 335-6:	Fulcher of Chartres, pp. 295-6:	Albert of Aachen: pp. 414-6:	Ralph of Caen, p. 691:
Videntes autem nostri seniors, ex qua parte esset civitas magis languida, illuc in quadam nocte sabbati deportaverunt nostram machinam et ligneum castrum in orientalem partem. Summo autem dilucul erexerunt ea et aptaverunt et ornaverunt castrum in I^{ma} et I^a et III^a feria. Comes namque S. Egidii, a meridiana plaga reficiebat suam machins am	Videntes autem Sarraceni qui infra civitatem erant multitudinem machinarum quae construebantur, infirmiora murorum loca, adeo adversum nos munierunt, ut quibusdam desperabile videretur. Instante autem iussae oppugnationis die, dux et comes Flandrensis atque Normanniae comes, cum vidissent quod Sarraceni tante ac talia munimina argumentorum contra nostras machinas composuissent, tota nocte machinias suas, et crates et aggeres transportaverunt contra urbis partem quae est ab ecclesia beati Stephani usque ad vallem	Machinis autem paratis, arietibus scilicet et scrophis, ad adsiliendum urbem item paraverunt, inter artificia vero illa turrim unam ex lignis exiguis, quia magna materies in locis illis non habetur, compegerunt, quam noctu, edicto proinde facto ad unum civitatis cornu frustatim detulerunt et sic mane ipso cum *petrarias* et cetera adminicula paravissent, citissime haud longe a muro compactam erexerunt. quam erectam et de coriis deforis bene munitam, paulatim promovendo muro propius impegerunt.	Dehinc, ieiunio cum processione sancta et letania et oratione finito, iam celum tenebris operientibus noctis in silentio deportata est machina per partes et uniuersa strues *mangenarum* ad ipsum locum ciuitatis, ubi oratorium situm est protomartyris Stephani, uersus uallem Iosaphat, in die sabbati collocates tabernaculis in circuitu machine ab hac statione sublatis. Vbi machina et omnia *instrumenta mangenarum* et arietis ad unguem fabricata sunt. Verum ex consilio maiorum *instrument*	adhuc tamen postes, tabulae, crates, nexus inconnexi, annectiet erigi, sed prius transferru indigebant. Ad transferendum ergo nox eligitur; dies crastini jacientia erigit, sparsaque huc illuc membra in suum redintegrat corpus. Translatas quoque machinas mox transpositio sequitur castrorum, ut jam non minus obsessis quam obsessoribus palam fieret quoniam murus ille bello fuerit destinatus. Ingravescit itaque civibus malum; turbatur omnium mens consilii inops. Qua praevisus fuerat certaminis

Iosaphat. Vos vero qui haec legitis, non putetis parvum laborem atque industriam ibi fuisse. Etenim fere millarum ibi est, a loco unde mahinae, dissolutae per membra comportabantur, usque ad eum locum ubi construebantur. Mane autem facto, cum vidissent Sarraceni omnia instrumenta atque tentoria, nocturno tempore illuc deportata, obstupuerunt. Nec solum Sarracenis, verum etiam nobis in stuporem fiebat. Manifeste etenim potuit cognoscere fidelium quia manus Domini nobiscum erat.

atrium mangenarum ordinata eriguntur, quarum priori assultu et impetus Christiani ciues Sarracenos a muris et minibus arcentes absterrerent, et muralia repentino iactu et silicis tactu perfringere ualerent. Tandem Sarraceni hoc impetu et iactu perspicientes muros grauiter concuti et mini, saccos stipula et palea refertos, ac nauium funes magne grossitatis strictim densatos, muris et menibus afigentes opposuerunt, quatenus impetum et ictum *mangenarum* molliter exciperent, et nequaquam muris et menibus nocerent

[battering ram used against outer ramparts]

occursas, fastigiosae moles timorem excluserant. Praetera partem illam multo menore sollicitus munierat labor, *balearibus* scilicet *tormentis* ad hostiles assultus; frustra haec autem, quippe amoto hinc, et aliorsum admoto, ut dictum est, metu: quod tamen in extremis rebus solatium restat, machina interior transplantatur, ubi opposita reverberet eteriorem transportatam.

> **p. 416:** Interea dum aries extinguitur, *mangenarum* iactus et impetus assidue muros minuebat, custodies ac defensores a minibus arcebat.

There were two main thrusts of assault on the walls of Jerusalem by the crusader forces. The majority of the groups within the army attacked from the north while Count Raymond of St. Gilles attacked from the south. On the night of 9-10 July 1099 the northern contingent altered the point on the walls at which their assault was directed.[155] Rather than attacking from the northwestern stretch of the walls they moved further east and closer to the valley of Josaphat. The movement of the point of assault around the walls was crucial to the success of the siege as the crusaders were no longer facing a stretch of wall that had been strengthened by the defenders and thus it allowed for an easier aproach. The importance of this movement meant that there are numerous surviving accounts with significant descriptions of the event. Several of these accounts make reference to the artillery pieces that were transported with the siege-towers, which were the main method of assault.

The first item worth noting from these extracts is the basic terminology used by the various accounts. Albert of Aachen characteristically refers to *mangene* at five points.[156] This is in accordance with his usual terminology. The *Gesta Francorum* refers to the transport of *machinam et ligneum castrum* towards the east of the city. It is unclear what exactly was being referred to by the singular term *machina* but it seems likely that it was the battering ram that is given prominence in the accounts of Albert of Aachen and Fulcher of Chartres and which was used to prepare the way through the outer defences for the approaching siege-tower.

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[155] H. Hagenmeyer, *Chronologie*, p. 249.

[156] AA, pp. 414-6: *mangenarum*; *instrumenta mangenarum*; *instrument atrium mangenarum*; *mangenarum*; *mangenarum*.

Certainly the battering ram played a more central role in the assault than the artillery pieces and it would seem, therefore, a good candidate for the one *machina* mentioned by the *Gesta* alongside the *ligneum castrum*. The account of Fulcher of Chartres, on the other hand, has a more direct reference to artillery in the term *petratia*. This term has been identified as very likely to be a general word to denote a stone throwing apparatus but, perhaps, nothing more specific. Raymond d'Aguilers is another source that, in this instance, has no direct reference to artillery which tallies with the lack of specific information in the *Gesta Francorum* which Raymond d'Aguilers used as a source for his own work.

The phrase in Ralph of Caen, *Balearibus scilicet tormentis ad hostiles assultus*, is one that has an interesting problem with translation. The edition of Ralph of Caen's work translated by B. Bachrach and D. Bachrach translates the phrase as 'with stone throwers and with catapults to attack the enemy.'[157] This interpretation is problematic in that there is little to suggest that Ralph of Caen's turn of phrase was intended to indicate a plurality of types of artillery pieces. The word 'and' does not appear in the Latin; *scilicet* does not function as a conjunction. It must also be considered that the two terms *Balearis* and *tormentum* are not strangers to one another in other parts of Ralph of Caen's work. The two terms appear together during Ralph's account of the siege of Ma'arrat-an-Numan and at two other points in the narrative 'Balearic' is used as an adjective for other artillery terms.[158] Both the turn of phrase and the larger trend of references to *tormenta* in Ralph of Caen's *Gesta Tancredi* suggest that this was intended to be one machine and that the words *Balearis* and *tormenta* are a pair with *Balearis* as an adjective for the noun *tormenta*. There is little to suggest that this phrase is best translated as 'with stone throwers and with catapults to attack the enemy'. It is unfortunate that this incident in Ralph of Caen tells us little about the type of machines employed. Although it is clear that these were pieces of artillery and that they were, perhaps unsurprisingly, being used *ad hostiles assultus*, Ralph of Caen tells his readers nothing about how they operated.

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[157] RC, Bachrachs, p. 139.
[158] RC, p. 679 – *balearica tormenta*. *Ibid.*, pp. 674, 692.

Raymond d'Aguilers:	Fulcher of Chartres:	Albert of Aachen, pp. 422-8:	Ralph of Caen, pp. 692-3:
pp. 338-9: Ut autem nostri turres, ad muros ducere coeperunt, ab omni parte volabant lapides excussi a *tormentis* atque *petrariis* et sagittae grando ut innumerabiles... sed non solum lapides et sagittae, verum etiam ligna et stipulae proiiciebantur, et super haec ignis et mallei lignei involuti pice et cera et sulphure et stupa et panniculis igne succensis proiiciebantur in machines.	**p. 296:** tum vero rari tamen milites, ad ducere audaces, monente cornu, ascenderunt super eam, contra quos Saraceni nihilominus se defendo faciebant, et ignem cum oelo et adipe vividum cum grando ut innumerabiles... sed iam cum faculis aptatis praedictae turri et militibus, qui errant in ea, *fundibulis* suis iaculabantur. Multis igitur utrorumque sic invicem certantium mors erat praesens et festina. **p. 298:** iamiamque ardebat arx una in muro lapidea supra quam *machinatores* nostri torres flammeos iniecerant, unde foco	Ciues autem et milites Regis Babylonie uidentes sic Regis legationem dissipatam, et audacious Christianos urbem expugnarem et quia hinc et hinc machine nimium urbi infeste aduersarentur, apposuerunt et ipsi *instrumenta quatuordecim mangenarum* erigere, quarum uirtute et impetus assidue in machinas lapides iactarentur, quorum crebris icitbus attonite quassarentur ac perirent, et in eis positi una in earum ruina periclitarentur. Ex hiis uero quatuordecim *mangenis* nouem machine comitis opponuntur cum innumerabili manu et uirtute ciuium. Quarum crebro et intolerabili impetus grauiter machina concussa et adrita est, eiusque compagines dissolute. Quin uniuersi in ea uiri belligeri nimium artati et stupefacti, uix a mortis periculo elapsi sunt. Vnde quia tot creberrimos lapidum ictus sustinere non poterant et machine protectio defecerat procul a minibus reducta est machina nec ultra inuentus qui hanc iterato ascenderet, et ciues inpugnando lacerceret. Quinque uero residue contra machinam ducis eriguntur, ut eam pari impetus et iactu percuterent	[Use of battering ram and initial advance of a siege-tower] Interea non cessat clamor, non fragor, non vulnus; saxa spicula, sagittae utrinque Volant; scuta, galeae, crates, muri ad ictus remugiunt: prae sonitu et jactu, occuli auresque non magis suum exercent opus quam alternum. Coeptam tamen moles lignea non tardat viam, satans perstat, ut post obrutam callis barbicanam jam patebat liberior. At ubi eo usque appropiatum est ut alternae cuspidis obvium jam tinniret ferrum, idem qui obstacula prius, quasi praeco graecus mylanys clamans dominae sequentis, removeraat aries, consecutae modo turriculae unicus obstabat. Procedere murorum non

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159 William of Tyre includes this event in his account incorporating several mentions of artillery (*machinis iaculatoriis*; *machinas*; *minoribus tormentis, quae mangana vocantur*; *tormentis*; *machinas*; *tormentorum*) but has no original information to offer; WT, pp. 403-4.

pp. 341-2:

Quae vero et qualia molimina ab utrisque per noctem facta fuerint, mirabile credite. Mane autem facto, tantus ardor nostris incubuit, ut usque ad muros progrederentur et machinas illuc deducerent. At Sarraceni tantas *machinas* fecerant, ut unicuique de nostris, novem vel decem opponerentur, atque sic multum nostra molimina impediebant. Iam *machinae* nostrae quassabantur ad tam crebos lapidum ictus, et viri deficiebant nostri, multimode defatigati.

paulatim inter lignorum materiam nutrito, fumus flammaque sic prodire coepit, ut nec quidem unus custodum civum ibi ulterius morari posset

et attererent. Sed Deo auxiliante licet crebro ictu tacta et quassata ruinam minaretur, integra et inuicta permansit, et uimineis cratibus protecta, miros impetus lapidum molliter exceptos tolerabat. Erat crux in summitate euisdem machine figuram continens Domini Iesu auro fulgidissima. Quam idem Sarraceni iactu mangenarum assidue moliebantur percellere, sed nulla eis feriendi aut amouendi facultas concessa est. ilis uero sepius iacturam lapidum aduersis crucem hanc molientibus, lapis fortuitu aduolans militem quendem assistentem lateri ducis in caput fortiter perculit. Qui fracto cerebro et effuses ceruicibus momenetaneo fine extinctus est. Dux uero uix ab ictu tam repentino obseruatus, multum baleari arcu ciuibus et *mangenas* torquentibus resistebat, et crates a machina in impetus auulsas, interdum reparabat, et funibus religabat.

Sarraceni milites uidentes quia impetus *mangenarum* crates uimineas penetrare non poterat, interdum ollas flammiuomas iactabant in crates machinam protegentes, ut prune aut scintilla aride materiei adherents leui aura suscitate ampliarentur, , et machinam

permittebat recurrere prohibebat dextram diuerticulo natura negabat: cuja refert dumtaxat, modo egredi, regredi modo, digredi nunquam. Dedit ergo poenas Normannico torre ambustus latera, quod a cornu strenuo ungulae degeneravit segities; id ipsum prius interior flamma rentaverat, sed affluens incendio occurit unda exterior, ille mansit illaesus.

objecto; machina subsecuta; laevamque gradientis

[The siege-tower suffered damage caused by the weakness of the wood, this damage was much lamented by the crusaders]

Inter hos tamen gemitus, falcate acie armatur pertica, ad secandos funes chalybs efficax: quorum nexibus implicitae de muris minabantur trabes.

pp. 341-2:

Quae vero et qualia molimina ab utrisque facta per noctem fuerint, mirabile credite. Mane autem facto, tantus ardor nostris incubuit, ut usque ad muros progrederentur et illuc machinas deducerent. At Sarraceni tantas machinas fecerant, ut unicuique de nostris, novem vel decem opponerentur, atque sic nostra multum molimina impediebant. Iam machinae nostrae quassabantur ad tam crebos lapidum ictus, et viri deficiebant nostri, multimode defatigati.

paulatim inter lignorum materiam nutrito, fumus flammaque sic prodire coepit, ut nec unus quidem custodum civum ibi ulterius morari posset

et atterererent. Sed Deo auxiliante licet crebro ictu tacta et quassata ruinam minaretur, integra et inuicta permansit, et uimineis cratibus protecta, miros impetus lapidum molliter exceptos tolerabat.

Erat crux in summitate euisdem machine figuram continens Domini Iesu auro fulgidissima. Quam idem Sarraceni iactu mangenarum assidue moliebantur percellere, sed nulla eis feriendi aut amouendi facultas concessa est. ilis uero sepius iacturam lapidum aduersis crucem hanc molientibus, lapis fortuitu aduolans militem quendem assistentem lateri ducis in caput fortiter perculit. Qui fracto cerebro et effuses ceruicibus momeneteneo fine extinctus est. Dux uero uix ab ictu tam repentino obseruatus, multum baleari arcu ciuibus et *mangenas* torquentibus resistebat, et crates a machina in impetus auulsas, interdum reparabat, et funibus religabat.

Sarraceni milites uidentes quia impetus *mangenarum* crates uimineas penetrare non poterat, interdum ollas flammiuomas iactabant in crates machinam protegentes, ut prune aut scintilla aride materiei adherents leui aura suscitate ampliarentur, , et machinam consumerent. Sed industria Gallorum artem aret preuenit. Nam coriis lubricis machina et creats operte flammas aut prunes iniectas minime retinebant, sed subito a coriis ignis labens humique cadens deficiebat.

permittebat objecto; recurrere machina prohibebat subsecuta; dextram laevamque diverticulo gradientis natura negabat: cuja refert dumtaxat, modo egredi, regredi modo, digredi nunquam. Dedit ergo poenas Normannico torre ambustus latera, quod a cornu strenuo ungulae degeneravit segities; id ipsum prius interior flamma rentaverat, sed affluens incendio occurit unda exterior, ille mansit illaesus.

[The siege-tower suffered damage caused by the weakness of the wood, this damage was much lamented by the crusaders]

Inter hos tamen gemitus, falcate acie armatur pertica, ad secandos funes chalybs efficax: quorum nexibus implicitae de muris minabantur trabes. . Horum igitur excisionem illarum mox comitata est solutio, solutionemque runia; dextimae sinistimaeque turris solatium cessabat, quarum remotiusculam Tancredus, propiusculam comes Normannus *fundae balearis turbine*

Tandem harum quinque *mangenarum* assiduis ictibus dux suique grautati et artati, applicuerunt machinam in uirtute Christianorum comminus menia et muros, ut sic tutior aduersus *mangenas* obsisteret, ac *mangene* propter edificia domorum, turrim abduci in loco spacioso non ualentes, minus iacernt et machinam ferire possent. Iam uero iuxta muros adducta machina, et quinque *mangenis* ab illa spaciosum recessum non inuenientibus lapis intortus et in impetu emissus, nimiam uicinam transuolabat machinam, aut interdum uolstu suo deficiens, iuxta muros cadens, Sarracenos opprimebat Sarraceni tandem intellidentes quia uiri in machina stant inperterriti, et *mangenarum* arte ledi non possunt, turrim quondam que uicinior erat machine saccis, stipula, foeno, uel palea impletis, ac uimineis cratibus densistate quoque naualium funium aduersus Christianorum *mangenas* undique in circuitu tectam lapidum munierunt, uiros pugnatores in ea constituentes, qui assidue moles lapidum *fundibulis* aut *paruis mangenellis* in machinam iacerent, et eius habitatores diuersis armorum terroribus artarent. Sed nec sic machina ducis Godefridi cedente, nec eius custodibus ad assultu repressis, sed amplius et seuius inualescentibus, Sarracenorum artifices aliud aptant ingenium, quo machina et euis possessors sine recuperatione.

dissolvebant. Suapte causa sollicitae acclamantem non audiebant viciniam. Praesertim Normannica, tam nocentior quo propior ideoque odiosior, facile jam succubuisset impulsibus: sed objectae *tormenta* paleae ruinam differebant. Latebant enim post saccos moenia, ut jam non tremerent ad marmor volans. Erant itaque labor multus, fructus minimus, planctus plurimus, risus nullus

[In this section there is an anecdote about a warlike priest, *sacerdos bellicus*, who inspired the despairing crusaders]

nam multa expertis, at frustra Celera, flumina quoque, qua licet, placuit imitari, ut vel sic chlamydatam; possent arcem exuere. Sitire cruorem arundo solita jam flammas vomit; non jam, inquam, exstingui aut extinguere sitens, sed ascendere furens; emittente cornu spicula, tellurem putes versa vice in coelum fluminare: ideo ferrum cadens aera ab imo in sublime dissecat, dum, pennae

subsequentis remigio adjuta, flammivoma cuspis paleas simul perfodit, qui nec jaculis ante cesserant, nec *balistis*. Vacuos igitur civibus muros scalae hostibus continuat, lignum saxis, murum machinae: hac quoque ope in urbem repit juventus avida, manibus, pedibus a procellis in portum tranans.

[The defenders then tried to set fire to Duke Godfrey's siege-tower by attaching to it a flaming log which had a *Catenam... ferream* as part of its structure, which made it more difficult to remove from the tower; this attempt failed.]

In eiusdem uero catene contentione ab intus et deforis, ac quinque *mangenarum* defectione ab intus frustra iactantium, dux qui in eminentioris arce cenaculi mansionem obtinuerat, omne genus iaculorum saxorumque in medium uulgus conglobatorum cum suis contorquebat et stantes in muro sine intermissione a minibus arcebat. Tres simul Christianorum *mangene* sine requie incessabili iactu menia transuolabant, et custodies hinc et hinc a minibus longo recessu absterrebant. Ad hec fratres prenominati Litholdus et Engelbertus, uidentes Sarraceos ocio torpere et manus a defensione continere, et ex utroque latere menium procul absistere, propter *mangenarum* exteriorum impetum, sine mora, quoniam muro erant propiores, a secundo cenaculo in quo erant, porrectis arboribus et inmissis in menia, primum in urbem in uirtute armorum descenderunt, uniuersis murorum custodibus in fugam conuersis.

This incident includes several entangled references to the artillery of both the crusaders and of those defending Jerusalem against the crusader assault. Although there have been suggestions that during the siege of 'Arqah the crusaders and defenders were using the same or similar types of artillery, this cannot be seen as the norm in the course of this campaign without evidence to support such a possibility.[160] The artillery of the attackers and defenders will initially, therefore, be treated separately and following those discrete examinations any similarities will be elucidated.

One of the first possible conclusions that can be drawn about the artillery utilised by the crusaders comes from the account by Raymond d'Aguilers who wrote that *ab omni parte volabant lapides excussi a tormentis atque petrariis et sagittae ut grando innumerabiles*. It is the reference to the *tormentis atque petrariis* that is immediately noticeable. The identification of two types of artillery in one description of an assault contains the suggestion that there was a plurality of types present in the crusader batteries at the siege. Such a conclusion is complicated, however, by the use in the same source of two terms to describe what is unquestionably one piece of artillery at another point in the siege of Jerusalem.[161] In that case, Raymond labels a machine first as a *petraria* and then as a *tormentum*; the terms used in that case are the same labels visible in the work of Raymond here also, where he refers to *tormenta* and *petraria*. The later example from the *Historia Francorum* suggests that the two terms were interchangeable in Raymond's mind but this incident suggests otherwise. What then can be ascertained from these two examples about the working of the Raymond's mind concerning artillery terminology? His was the work of an eyewitness to the First Crusade and, as such, has had a significant influence on the modern understanding of the course of the crusade. Its importance is clear but perhaps in the sphere of artillery terminology, the usefulness of the *Historia Francorum* should be doubted. These two contrasting uses of terminology may point to a conclusion that Raymond was not fully informed about artillery the terminology current to the military men of the late

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[160] See above, 'Siege of 'Arqah: Defenders' equipment', p. 180-182.
[161] See the next section on 'Siege of Jerusalem: The Death of *duae mulieres*', pp. 210-212.

eleventh century. Even if he was unaware of the correct terminology to apply to a specific machine, however, that does not preclude him from being able to recognise that two machines were different in form from one another. Thus, his contradictory uses of terminology do not invalidate the fact that he referred to two different types of artillery in use by the crusaders during the siege of Jerusalem. One type of artillery has already been identified as in use during this siege with a strong degree of probability: the traction trebuchet.[162] There is, however, the possibility of another form of artillery having been present but to identify another type of machine would require evidence that both precludes the involvement of a traction trebuchet and points toward the nature of the other type of machine. Raymond's use of the phrase *tormentis atque petrariis* does not provide this evidence and there is no other incident that illuminates this issue further. The number of different types of artillery used during the siege of Jerusalem must, therefore, remain a moot point especially since Raymond was alone in suggesting a plurality of types at this point of the siege.

The overall character of the artillery terminology employed by the various sources in the course of the incident is unremarkable. Albert of Aachen remained true to his regular usage of the term *mangene*, which was used both for the crusader and for the Fatimid artillery. Neither Ralph of Caen nor Fulcher of Chartres made direct reference to crusader artillery and Raymond d'Aguilers made the aforementioned references to *tormentis atque petrariis*. The evidence for the effectiveness of the crusader artillery is, however, more informative. Albert's account gives numerous details about the impact the crusaders' artillery had on the defences of the city.

There is a fragment of information regarding the strength of the crusaders' artillery in Albert's description of the measures the defenders employed to defend a tower. The account tells that the Turks

> turrim quondam que uicinior erat machine saccis, stipula, foeno, uel palea impletis, ac uimineis cratibus densistate quoque naualium funium aduersus Christianorum mangenas undique in circuitu tectam lapidum munierunt, uiros pugnatores in ea constituentes, qui assidue moles

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[162] See above, section on 'Siege of Jerusalem: Messenger/Spy thrown toward city', pp. 185-189.

lapidum fundibulis aut paruis mangenellis in machinam iacerent, et eius habitatores diuersis armorum terroribus artarent.[163]

The perception among those leading the defence of the city was that they had to defend this mural tower with *saccis, stipula, foeno, uel palea impletis, ac uimineis cratibus densistate quoque naualium funium* so as to absorb the blows of the artillery projectiles fired by the besieging crusaders. This indicates that there may have been a danger posed by the *Christianorum mangenas* to the structural integrity of the tower. There are precedents in the course of the First Crusade for the crusaders having attacked the walls and towers of cities in the course of the various sieges that occurred.[164] What was missing from those other examples, however, was the threat of serious damage to the defences under attack. This does not seem to be the case in this instance but it is necessary to point out that the cladding of the tower in dampening materials is not preceded in Albert's account by any reference to damage to the tower. This was not a reaction by the defenders to damaging actions by crusader artillery, rather it was a precautionary measure to avoid any such damage. There is no definite evidence in Albert's account that the crusader artillery was strong enough to batter down the walls and towers of Jerusalem. The account of Ralph of Caen, on the other hand, makes a very direct contention that this was the case. The *Gesta Tancredi* includes an account of an artillery attack by Tancred's forces on one tower and by Duke Robert II of Normandy's forces on another, both using *fundae Balearis turbine*. The account states:

> facile jam succubuisset impulsibus: sed objectae tormenta paleae ruinam differebant. Latebant enim post saccos moenia, ut jam non tremerent ad marmor volans. Erant itaque labor multus, fructus minimus.[165]

This assertion here that the towers would have been damaged easily (*facile*) by the *fundae balearis turbine* were it not for the *sacci* that had been attached to the wall to dampen the blows of the stones makes more directly the case hinted at in Albert's work that the crusader artillery were believed to be able to knock down the walls or, at the least, that Ralph wished to portray to his readers that they had that capacity.

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[163] AA, p. 424.

[164] *Ibid.*, p. 112-4, also see above, 'Siege of Nicaea: Count Raymond's Artillery Assault on a Mural Tower', pp. 124-125; AA, p. 202-4, also see above, 'Siege of Antioch: Battle at *Waiferii* Gate', pp. 138-142.

[165] RC, pp. 692-3.

It is difficult to accept the contentions of the sources at face value. There is, however, a common assertion in accounts of siege warfare that an initial assault on the walls that failed would have succeeded if only the attackers had possessed more ladders or more courage. Such assertions, which can be seen at the sieges of Ma'arrat-an-Numan and Jerusalem, seem to parallel the ideas expressed in Ralph of Caen that if only the towers of Jerusalem had not been cladded in *sacci* the attack of the artillery pieces would have succeeded.[166] The *Gesta Tancredi* is an account that has been seen to have gone to admirable lengths to avoid accusations of bias in favour of his former lord, Tancred.[167] This does not mean, however, that the *Gesta Tancredi* was unbiased in its view of the crusade movement. As a result, the claim that the walls would have been easily destroyed were it not for the dampening defensives should not be taken at face value. Ralph of Caen may well have been exaggerating so as to accentuate the effectiveness of the crusader army in a similar manner to the frequent ascribing of the failure of an initial assault on the walls to the lack of more ladders as has just been pointed out in the accounts of the sieges of both Ma'arrat-an-Numan and Jerusalem. Other than in Ralph's statement here, there is no evidence in the narratives of the First Crusade to show that the artillery employed by the crusaders had the strength to bring down the walls of a major city. The actions of the defenders of Jerusalem in cladding the walls with *sacci* should be seen as a precautionary measure to limit long term damage to the walls rather than as a measure to prevent their imminent destruction by the crusader artillery batteries. These events, however, do provide some evidence to suggest that the machines employed by the crusaders at Jerusalem had the ability to cause damage to the walls of the city.

There is a point in Albert of Aachen's terminology describing the projectile weapons of the defenders, at which there is a slight departure from his usual terminology. This unique reference occurs in the *Historia Ierosolimitana* when Albert was writing about the tower that the defenders had just strengthened, saying that *uiros pugnatores in ea constituentes, qui assidue moles lapidum fundibulis aut*

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[166] Rd'A, p. 166, 'ut si quatour scalas plus habuissemus, capta esset civitas; sed quoniam non habuimus nisi duas, et illas easdem breves et fragiles, et timide super eas ascenderetur'; *Ibid.*, p. 310, 'Cumque iam civitatis caperetur, subrepente desidia et timore, oppugnatio intermissa est, et tunc multos de nostris perdidimus'.
[167] RC, pp. 5-6.

paruis mangenellis in machinam iacerent, et eius habitatores diuersis armorum terroribus artarent. It is the reference to *fundibulis aut paruis mangenellis* that is most noteworthy in this incident. It can be seen from the use of the word *fundibula* that these *mangenelle* clearly used some form of sling. There are a number of elements in this section that illuminate our understanding of these *fundibula*. Firstly, it is stated that the crusaders fired *moles lapidum* from the *fundibula* but this tells us little about the form the weapons took. The use of the plural for the terms used in the description indicates that there was more than one of these weapons inside the tower, thus suggesting a compact weapon. Moreover, Albert also makes it clear that these *fundibula* were akin to *parva mangenella*.[168] These two points combine to suggest that these were not large weapons and although they hurled stones at the *machina*, they do not seem to have been used primarily to attack the structure of the approaching siege-tower. Instead their impact is summed up in Albert's statement that *eius habitatores diuersis armorum terroribus artarent*. In Albert's account the actions of the *pugnatores* in the mural tower did not damage the siege-tower rather they served to terrify and harass those manning the siege-tower.

Fulcher of Chartres' account of the assault on Jerusalem also employs the term *fundibula* in his account of the defence:

> tum vero rari milites, tamen audaces, monente cornu, ascenderunt super eam, contra quos Saraceni nihilominus se defendo faciebant, et ignem cum oelo et adipe vividum cum faculis aptatis praedictae turri et militibus, qui errant in ea, *fundibulis* suis iaculabantur.[169]

This incident contains the same term as that of Albert of Aachen and ascribes the use of these weapons to the *Saraceni* defending the city, rather like the account of Albert. What is different in this account, however, is the ordinance that is reported as having been fired. Whereas Albert of Aachen wrote of the men in the tower firing *moles lapidum* against the tower, Fulcher's *fundibula* were used to hurl *ignem cum oelo et adipe vividum cum faculis aptatis*. Based on the general nature of the appearance of this term over the course of of Fulcher's work, it has elsewhere been linked to small artillery pieces.[170] There is, thus, a striking similarity as well as an important discrepancy when the two sources are compared. Another similarity to be

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[168] See above, 'Albert of Aachen', pp. 59-61.
[169] FC, p. 296.
[170] See above 'Fulcher of Chartres', pp. 52-54.

noted is that the strength of Fulcher's *fundibula* is comparable to those in Albert of Aachen. The *fundibula* in Albert of Aachen's account threw stones but not of sufficient weight to damage the tower while those in Fulcher of Chartres' account threw flaming torches (*ignem... faculis*). The use of fire by the defenders is supported by Ralph of Caen who wrote that *id ipsum prius interior flamma rentaverat, sed affluens incendio occurit unda exterior, ille mansit illaesus*. There is no information given by Ralph about the exact form taken by the attempts to set the tower alight but it still backs the assertion by Fulcher that fire was used, even if it does not declare that torches were thrown from *fundibula*. That throwing of torches by the *fundibula* of Fulcher's narrative cannot be said to have required significant strength on the part of those weapons and, consequently, there is no strong evidence in Fulcher's account to contradict the interpretation of Albert's account that these were not likely to have been artillery pieces.

The question might be asked whether or not Albert's likening of the *fundibula* to *parva mangenella* offers any information about the working of either of these weapons. Certainly this is another occasion in the work of Albert of Aachen at which there is a connection between the working of those *mangenelle*, albeit small ones, and the presence of a sling. In this instance the presence of a sling is suggested by the comparison of mangonels to *fundibula*. At another point in the siege of Jerusalem, when a spy was being shot out of a full sized *mangena*, there was a reference to *pellis mangene*.[171] This strongly suggests the presence of a sling in the working of that machine: the presence of a *pellis* or 'skin' could mean little else. As a result, it can be seen that this connection between *mangenelle* and *mangene* and the presence of a sling is not an isolated occurrence. The manner in which Albert is constant in his connection between *mangene* or *mangenella* and slings suggests that he had a specific type of artillery in mind when referring to mangonels of all sizes.

One issue surrounding the artillery use of the defenders of Jerusalem emphasised by the crusade narratives is the notable number of engines involved. Albert's account is quite detailed regarding the numbers of machines. He wrote that

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[171] See above, section on 'Siege of Jerusalem: Messenger/Spy thrown toward city', pp. 185-189.

the defenders used fourteen artillery pieces, nine of which were deployed against Raymond of St. Gilles' forces to the south of the city: *Ex hiis uero quatuordecim mangenis nouem machine comitis opponuntur cum innumerabili manu et uirtute ciuium*. This left five for use against the northern assault (*quinque mangenarum*). The striking number of artillery pieces involved in the defence was also noted by Raymond d'Aguilers, who wrote: *At Sarraceni tantas machinas fecerant, ut unicuique de nostris, novem vel decem opponerentur, atque sic multum nostra molimina impediebant*. That these *machinae* were artillery pieces is confirmed by Raymond's subsequent line: *Iam machinae nostrae quassabantur ad tam crebos lapidum ictus, et viri deficiebant nostri, multimode defatigati*. There is thus agreement between Albert and Raymond that those inside the city had a significant number of artillery pieces defending them but, unsurprisingly for medieval sources, there is a discrepancy in their exact numbers. Albert stated that the defenders had fourteen pieces of artillery whereas Raymond d'Aguilers stated that the artillery of the defenders outnumbered the crusaders' machines by nine or ten to one. Given that neither nine nor ten is a multiple of fourteen, the two accounts cannot be reconciled on this matter. Both sets of numbers are plausible as they did not set a figure in the hundreds or higher for the number of machines defending the city. Given the necessary scepticism that must be applied to numbers given in medieval narrative sources, it would be redundant to attempt to tease out which was closer to the truth.[172] Instead, what can be deduced from these statements by two reliable authors is that there was a significant number of artillery pieces defending Jerusalem in 1099 and that the action of these machines was more effective on the south side of the city, leading to the assertion by Albert that there were more artillery pieces stationed at that part of the defences.

Nevertheless the number of machines used by the defenders proved irrelevant on the northern part of the struggle, according to Albert of Aachen, who reported that the siege-tower there was moved in close so that the siege engines would be able to fire over it and not to hit it. The hardship suffered by Duke Godfrey and his men at the hands of the five *mangene* positioned at the north of the

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[172] Fulcher of Chartres, for example, preposterously refers to the presence of 360,000 men in the army opposing the First Crusade at the Battle of Doralyeum; FC, p. 193.

city is what caused them to push their siege-tower closer to the walls. Albert relates that, as the *mangene* could not be brought into a large space (*loco spacioso*) due to the city's buildings they were unable to hit the siege-tower with their rocks as all the stones they threw went over the tower instead of hitting it.[173] This says much about the nature and limitations of the *mangene* employed by the defenders of Jerusalem. Their inability to hit the siege-tower when it was close to the wall is surely partly explained by the limitations that new position put on the possible surface area of the siege-tower that was available to be hit. If previously most of the projectiles had been striking the front face of the tower, then by pushing that face right up the wall, the primary target would have been removed. This would have left only the top and sides to hit and, assuming that the tower was taller than it was wide or deep, the top would have presented a much smaller target area than the front. It should also be pointed out that Albert of Aachen claimed in this passage that the defenders were not able to pull the *mangene* back as far from the wall and siege-tower as they would have liked because of the buildings in the city but that had they been able to do so, they could have struck the siege-tower with the projectiles from those *mangene*. This shows that the *mangene* defending the city were clearly not on the walls of the city, rather they were on the ground inside the city. This positioning on the ground, as well as the information that the machines had to be in a *loco spacioso*, combine to suggest that these pieces of equipment needed a significant amount of space in which to operate: they were not small engines of war.

There are two possible ways in which to explain this deficiency in the operation of the defenders' artillery. Either the artillery pieces were limited in their possible application or the skills of those soldiers operating those artillery pieces were lacking. The lack of accuracy may point to traction trebuchets that, being operated by a large group of men each pulling on a rope, would have been difficult to co-ordinate accurately to hit a small target. On the other hand, this could be seen to demonstrate a limited trajectory of the machines in question. If they could only fire at a certain angle then perhaps the proximity of the wall blocked that trajectory. From the limited evidence available, it is difficult to identify accurately what

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[173] AA, p. 424.

exactly this says about the nature of medieval artillery or the specifics of the siege of Jerusalem. There is certainly a lesson here about the limitations of artillery. Moreover, it needs stating that Albert's level of detail here is suspicious. The ability of any of the people who informed him on the proceedings of the crusade to know exactly the procedures with the defenders' artillery inside the city is debatable. Consequently and given that the *Historia Ierosolimitana* is alone in providing this information, Albert's testimony should perhaps be seen as a general statement on the nature and limitations of medieval artillery rather than on the specifics of the situation at Jerusalem.

One element of the nature of the defenders' artillery about which there is some certainty is the impact they had on their primary targets, the approaching siege-towers. A strong barrage of artillery projectiles crippled Count Raymond's tower approaching from the south but the *mangena* positioned to the north had little impact on the machines there. It must be reiterated that there were, according to Albert, more pieces of artillery posted against the forces approaching from the south than against those to the north; Albert's numbers placed five pieces of artillery against the tower of Duke Godfrey and the associated forces there in comparison to nine that targeted Count Raymond's. Albert's assertion of numerical difference between the artillery pieces posted against the two points of attack is born out by the damage caused to each tower. Duke Godfrey's tower survived because of the astute positioning of the siege-tower so that the artillery of the defenders could not strike it and because, as Albert noted, *Sarraceni milites uidentes quia impetus mangenarum crates uimineas penetrare non poterat*. This failure of the rocks fired from the *mangene* caused the defenders to resort to throwing *ollas flammiuomas* to try damage the tower. That the fire also failed is irrelevant for the purposes of this discussion; the key points to note are the multiplicity of functions that the *mangene* could fulfil in firing both rocks and *ollas flammiuomas* as well as the lack of strength in those machines to damage a well constructed and defended siege-tower. Raymond d'Aguilers also wrote about the various methods of assault tried by the defenders against the siege-towers:

> sed cum iam proximarent cum machinis ad muros, non solum lapides
> et sagittae, verum etiam ligna et stipulae proiiciebantur, et super haec

> ignis et mallei lignei involuti pice et cera et sulphure et stupa et
> panniculis igne succensis proiiciebantur in machinas

Through examining the defensive measures that the siege-towers resisted, it seems that the towers constructed by the crusades were well designed and defended, especially that of Duke Godfrey which eventually brought about the fall of the city. It is also evident from the inability to destroy all the wooden towers arrayed against them that the artillery employed by the defenders did not possess an especially high level of power. This fits well with the evidence on artillery manifest throughout the crusade that artillery employed by every group involved in fighting both on and against the crusade was not particularly strong. There is no evidence that any artillery employed in the course of the First Crusade had the ability realistically to breach masonry defences in the manner which later artillery could.[174]

In Ralph of Caen's account of the assault on Jerusalem, the clearing of the wall of defenders allowing the crusaders to gain a foothold from the siege-towers is attributed to the fire brought about by the firing of flaming arrows at the chaff on the walls of the city. The success of the fire in clearing the walls is significant in Ralph's work, as he says that *dum, pennae subsequentis remigio adjuta, flammivoma cuspis paleas simul perfodit, qui nec jaculis ante cesserant, nec balistis.* The statement given here is that the fire achieved what could not be achieved by the *jacula* or *balistae*, namely, the clearing of defenders from the walls. What is most significant about this line in Ralph of Caen's *Gesta Tancredi* is that it is one of only two cases of the term *balistae* being used in the siege of Jerusalem or, indeed, in the First Crusade after the departure of the crusader forces from Antioch. The other appears in the work of Guibert of Nogent.[175] The nature of this reference to *balistae* suggests that the weapons being referred to were involved in attempts to harry and assail the defenders on the walls of Jerusalem. The actions of these *balistae* as well as those of men wielding or throwing *jacula* failed in beating back the defenders from their positions but it was in noting that failure that Ralph pointed

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[174] For discussions of the later successes of artillery against masonry defences see below, 'Siege of Caesarea (1101): Final Assault on the City', pp. 245-246; above, 'Siege of Sidon (1107): Attack on a Mural Tower', pp. 258-261; below, 'Siege of Cerez: Artillery Breach', pp. 272-274; below, 'Siege of Ventula', pp. 274-275; below, 'Siege of Caesarea (1138)', pp. 296-297.

[175] GN, p. 275.

to the use of *jacula* and *balistae* in that manner. This reference to *balisitae* is awkward as it is being Ralph's only such reference. Unlike the accounts of Albert of Aachen and Robert the Monk, where there are sets of references to this problematic term, the *Gesta Tancredi* provides no other uses of the term to provide further context. It is also unclear whether or not the *balistae* mentioned here were artillery pieces or not. Given these two pieces of information, it is difficult to come to a conslusion on the exact nature of the items being referred to by Ralph as *balistae*; they could have been artillery pieces or crossbows.

In Albert of Aachen's version of events, there is a different primary explanation of the crusaders' success in clearing the walls of defenders to allow for the ingress of the crusader forces. His account portrays the assault by the Christian artillery as the key element in achieving that end rather than the fire to which Ralph assigns responsibility. That is not to say that Albert omits any mention of fire from the crusader assault on the city: he mentions it but accords it less significance than does Ralph. There is some confusion, therefore, about the exact effectiveness of the crusader artillery in the course of the siege of Jerusalem; it is clear from the accounts of both Ralph and Albert, however, that the crusaders were using their artillery to harass and disrupt the defenders operating on the wall. Albert gives this information quite directly in according the artillery action the credit in clearing the walls for what became the final assault. Ralph, on the other hand, gives similar information but in a different manner. In noting the failure of the *jacula* and *balistae* to do what the fire eventually achieved, clear the walls, he strongly intimated that this was one of the results the crusaders intended to achieve through the use of artillery. Thus, although there is a question here about which of the two posited methods of assault, fire or artillery action, caused the defenders to abandon their positions on a key stretch of wall, there is agreement also that the crusader artillery was employed with this end in mind. The nature of the artillery use is not being questioned here, merely its success.

THE DEATH OF *DUAE MULIERES*[176]

Raymond d'Aguilers, p. 342:

> Verum hoc praeterire non libuit, quod, cum duae mulieres *petrariam* unam de nostris fascinare vellent, lapis de eodem *tormento* viriliter excussus, mulieres carminantes cum tribus puellis parvulis allisit, atque animabus excussis, incantationes avertit

From the midst of all the references to artillery in the final assaults on the city, described in the previous section, there is one incident from Raymond d'Aguilers' work that can be picked out as distinct from the artillery described in conjunction with the siege-tower assaults. This incident describes how *duae mulieres* were killed while, apparently, trying to cast a spell or curse on a Christian *petraria*. An initial point to recognise about this incident is Raymond d'Aguilers' clear wish to use this event to promote his religious beliefs by showing the wrath meted out by God against the women who sinned by engaging in witchcraft. Thus, though the account cannot be said to be definitively incorrect or untruthful, its veracity should be questioned, especially as Raymond was alone among the chroniclers in including this event. That is not to say, however, that there is nothing to be gained from an examination of this description of artillery in action. The action and effect of the artillery piece would still have required a ring of truth to avoid the contemporary reader dismissing the story as entirely unrealistic.

The most important element to be taken from this event is Raymond's application of two distinct terms to the one artillery piece; firstly the machine is described as a *petraria* and then it is a *lapis de eodem tormento* that kills the women. There are a number of possible explanations for this apparent contradiction. Perhaps these were interchangeable words for various artillery pieces in Raymond's views of things or one of the two was a general term for artillery and the other was more specific. Alternatively, it could be argued that Raymond was ignorant of the specific, proper terms that should be applied to particular types of artillery. Certainly, this is not the only occasion in the account left by Raymond d'Aguilers

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[176] William of Tyre includes this event in his account, incorporating several mentions of artillery (*machinis positi iaculatorias*; *machinarum iactu*; *machina*; *machina*). He has no original information to offer; WT, pp. 405-7.

where these two terms appear in proximity. Earlier in the course of the siege of Jerusalem Raymond reported that *ab omni parte volabant lapides excussi a tormentis, atque petrariis et sagittae ut grando innumerabiles.*[177] In that incident, however, the *tormentum* and the *petraria* referred to are not the same machines. In this case, however, it is clearly only one artillery piece that is referred to by both the terms *petraria* and *tormentum*. This inconsistency casts doubt on Raymond's knowledge of artillery and, arguably, on his knowledge of military affairs in general. What seems the most likely implication in this instance is that one of the terms is a general term for artillery whereas the other is more specific, thus, allowing the two different terms to apply to the one machine. The candidate that seems more likely to be the general term is *petraria* as it has the sense of a stone throwing machine but the word means little else. This, however, is conjecture and the *tormentum* could just as easily be argued to be a general denotation for artillery. That one of the terms might be general does not preclude Raymond's account from making sense in the other quoted instance also. It is possible that Raymond was referring to a specific type of machine but also informing the reader that another type or types of artillery were present. If that were the case, both instances of the juxtaposition of the terms *tormenta* and *petraria* could be seen to make sense. Without a more wideranging systematic appraisal of the terminology associated with artillery use, however, confirming this possibility and identifying the general term are problematic.

One other thing that can be said with some measure of assuredness is that the artillery in this instance was being used in an anti-personnel manner. It does not necessarily show, however, that the concentration of the artillery was on attacking and limiting the effectiveness of the defenders themselves and citizens rather than on attacking the walls and defences of the city. Instead, it merely shows that the artillery had the capacity to cause considerable damage to human life. Such damage would have been possible both for an artillery piece designed and operated with the single-minded purpose of attacking people and for a machine which was attacking the defences but which accidently hit some defenders in the process. The level of detail available in this incident does not allow one to pinpoint what exactly the

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[177] Rd'A, p. 338; also see above section, 'Siege of Jerusalem: Artillery Involvement in Siege-tower attack', pp. 194-209.

intention of the artillery-men was when they released the *lapis* which killed the women.

THE *TAFURS*

Guibert of Nogent, pp. 310-11:

> Erat preterea et aliud quoddam in exercitu illo hominum genus, quod nudipes quidem incederet, arma nulla portatet, nullam ipsis prorsus pecuniae quantitatem habere liceret, sed nuditate ac indigentia omnino squalidum universos precederet, raducibus herbarum et vilibus quibusque nascentiis victitaret. [...] Putaret hos forsitan quilibet generali utilitati prorsus incommodes ut unde aliis poterat suppetere sumptus, absque proficuo tales consumere cibos. At vero hi in convehendis victualibus, in stependiis contrahendis, in obsessione etiam urbium lapidibus in torquendis, dici non potest quam necessarii forent, cum in portandis oneribus asinos ac iumenta precederent, cum *balistis et machinis* crebris iactibus exequarent.

As well as their appearance in Guibert of Nogent's account of the crusade, the *Tafurs* appear in two of the *Chanson de Geste*: the *Chanson d'Antioche* as well as the *Chanson de Jérusalem*.[178] This group were said to have resorted to cannibalism during the siege of Antioch. To what extent they actually existed rather than being a construct to portray some of the sin in the crusader camp is debatable – Daniel has questioned whether their appearance in the *Chanson de Jérusalem* was a reflection of historical fact or a fictional reflection of social realities.[179]

The depiction of the *Tafurs* in Guibert's account of the First Crusade sheds light on the possible organisation of the army and the tasks carried out by various elements of that force. In his description of the aftermath of the siege of Nicaea, Guibert of Nogent intimated that the *mediocres* part of the army were involved in, amongst other things, the operation of the artillery. There was a sense in that section that this work was not carried out by the *pauperes* in any significant manner,

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[178] For discussions of the Tafurs see: N. Cohn, *The Pursuit of the Millenium* (London, 1970) pp. 65-7, 72, 89, 283; N. Daniel, *The Arabs and Medieval Europe* (London, 1979), pp. 133-4; C. Kostick, *The Social Structure of the First Crusade*, pp. 82-3; L. A. M. Sumberg, 'The Tafurs and the First Crusade', *Medieval Studies* 21 (1959), pp. 224-46.

[179] N. Daniel, *The Arabs and Medieval Europe*, p. 133.

although a limited involvement on their part cannot be ruled out entirely.[180] That sense is backed up by Guibert in this section. The description of the actions of these extremely poor members of the First Crusade is telling. They are depicted as throwing stones and of being 'regarded as equal' (*exequarent*) to the *balistae et machinae* in the carrying out of this task. Crucially, however, they are not depicted as having been involved in the operation of the *balistae et machinae*, only as being their equal in the throwing of stones. It would seem that they achieved this feat through the use of their hands alone to propel stones at the enemies of the crusade. If that were the case then, surely, equating their effectiveness with that of machines specifically designed for the purpose of throwing stones has more than a touch of hyperbole to it. For the purposes of understanding the working of artillery pieces in the course of the First Crusade, however, this is vital as it does suggest more strongly than the earlier section from the siege of Nicaea that the poorer elements were not involved in handling the machinery. Any conclusions about the organisation structure of the army of the First Crusade vis-à-vis the social make up of the groups operating artillery pieces must, however, be limited to that crusade; the make up of that particular movement makes it unique as there were few other sieges in that era with a similar amount of poor companions travelling with the army.

THE GENERAL DEFENCE OF THE CITY

Guibert of Nogent, pp. 334:

> Iherosolimorum igitur civitas obsessa exprimi non potest quanta sit civium suorum animositate defense. Videres contra *baleari instrumenta*, quibus compererant saxa torqueri, trabibus obtegere muros atque psiatiis, grecos, quos ita vocitant, ignes inicere machinis, presertim qui materiei inopiam difficultatem maximam noverant obsidionis.

This brief artillery reference, unique to Guibert of Nogent, forms part of an attempt to show how well the crusaders did to overcome the defenders of Jerusalem. The *Baleares instrumenta* mentioned in the course of it were the

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[180] See above, 'Siege of Nicaea: The Aftermath of the Siege', pp. 131-133.

machines of the crusaders. The defenders of the city threw stones at those machines but it is not said with what methods or machines the defenders did so. The phrase *baleares instrumenta* is a very general one that shows little about the exact nature of the machines in question other than that they were instruments for throwing or hurling.

CONCLUSIONS

On top of examining the evidence for artillery use in the context of individual case studies there are several issues that must be treated in a larger context. To achieve this, the strands of information brought to the fore by the different case studies examined above will now be inspected, under several headings, to investigate properly the larger issues surrounding artillery in the First Crusade.

ARTILLERY TYPOLOGY IN THE FIRST CRUSADE

References to *balistae* in the First Crusade narratives have several facets. Their appearance in the sources for the First Crusade is complex and problematic despite being in a relatively clear pattern throughout the First Crusade. As a classical artillery term, the appearance of *balista* in the course of sieges raises questions about the debated continuity of classical artillery types from the antique world through into medieval Europe.[181] The term had two meanings in the classical world. Initially it was used to denote large and powerful stone-throwing artillery pieces but at some point in between 100 and 300 A.D. the usage of the term changed to denote instead a specifically bolt-firing machine resembling a large crossbow.[182] It is this later sense of the term that, it will be posited here, was more likely to have survived and to have been current in the medieval period.

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[181] See below, p. 217.

[182] E. W. Marsden, *Greek and Roman Artillery, Historical Development*, p. 2.

The change in the use of the term occurred before the late antique *Epitoma Rei Militaris* of Publius Flavius Vegetius Renatus was written.[183] This work had a very direct impact on the knowledge of military affairs in the Middle Ages and can be seen to have been available to military leaders and their advisors throughout the Middle Ages including princes such as Count Fulk III 'Nerra' of Anjou in the late tenth and early eleventh centuries, King Henry II of England (1154-1189) and his successor Richard I (1189-99).[184] Overall there are fifty-four extant manuscripts containing Vegetius from before the year 1300.[185] The widespread use of the text in the Midde Ages is attested to by its quotation by such authors as Alcuin, Rabanus Maurus, Aegidius Romanus, Christine de Pisan and Jean de Fayt.[186] Its influence has also been traced in the writings of authors such as the Venerable Bede, the influential twelfth century author, John of Salisbury and later authors such as Giles of Rome.[187] The importance of the influence attained by Vegetius' work to this discussion can be seen in his description of the *balista* in that work:

> Ballista funibus nervinis tenditur, quae, quanto prolixiora brachiola habuerit, hoc est quanto maior fuerit, tanto spicula longius mittit; quae si iuxta artem mechanicam temperetur et ab exercitatis hominibus, qui mensuram eius ante collegerint, dirigatur, penetrat quodcumque percusserit.[188]

This description clearly identifies a number of elements in the *balista* that tie it conclusively to a large crossbow-type device. The projectiles fired are clearly identified as *spicula* and the power for the projection of those missiles comes from *funibus nervinis tenditur*. This, combined with the presence of *brachiola* in its construction, makes it clear that this *balista* is of a crossbow-type design. The power of the weapon is also worth noting. Vegetius states that a balista's projectiles *penetrat quodcumque percusserit*. This kind of power makes it clear that the *balista* is an artillery piece with significant might. Thus, the most influential military treatise in the Middle Ages described the *balista* as a strong machine powered by

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[183] The exact date of the work is unknown; for the debate on the dating see, Michael B. Charles, *Vegetius in context: establishing the date of the Epitoma rei militaris* (Stuttgart, 2007).

[184] C. R. Shrader, 'The Influence of Vegetius' *De rei militari*' in *Military Affairs*, XLV, 4, p. 169.

[185] *Ibid.* p. 172, endnote 14.

[186] *Ibid.* endnote 11.

[187] *Ibid.* p. 172, endnote 11.

[188] Vegetius, pp. 138-9; E. W. Marsden, *Greek and Roman Artillery, Technical treatises*, p. 236.

ropes and firing bolts. Given the extent to which this source was disseminated throughout the period examined in this thesis, as well as earlier and later, it is not unreasonable to make the case that the word *balista* was tied, at least partially, in the medieval mind to the idea of a powerful, bolt-firing piece of artillery. That does not, however, automatically mean that every use of the term by a medieval source must be seen as a reference to a piece of artillery with a classical morphology. Instead, given the dichotomous nature of the term, every account and every event involving such terms must be examined on their merits both individually and in the larger context of the entire breath of source material available on the events in question, as has been done in this examination of case studies.

What the link between the term *balistae* and a bolt-firing artillery piece does show, and this is borne out by the case studies examined above, is that the term *balistae* was viable for the description of artillery. It has been shown on seven different occasions in the various case studies examined above that the use of *balistae* was either definitely or probably a reference to one or more artillery pieces. These references occurred four times at Nicaea and three times at Antioch.[189] These various references come from several different sources: Robert the Monk, Albert of Aachen, Raymond d'Aguilers and Baldric of Dol all used the term *balistae* in a manner that links it strongly to artillery. This was, therefore, a widespread phenomenon and not something limited to the eccentricities or idiosyncrasies of a single writer. How much can be taken from this connection must be qualified, however. The use of *balistae* to describe artillery does not necessarily mean that it is denoting that particular type of artillery described in the late classical period by such authors as Vegetius; that is a possibility but one requires corroborating or auxiliary evidence to confirm or disprove.

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[189] RM, p. 756, also see above 'Siege of Nicaea: Construction of Equipment by the Crusades on Ascension Day', pp. 108-110; Rd'A, p. 19, also see above 'Siege of Nicaea: Defenders' Artillery', p. 117-119; RM, p. 757, also see above 'Siege of Nicaea: Heads Thrown into the City', pp. 119-124; AA, pp. 120-2 also see above 'Siege of Nicaea: Alternative Siege Tactics Applied to Nicaea', pp. 130-131; RM, p. 775, also see above 'Siege of Antioch: Building of Equipment by the Crusaders', pp. 134-137; RM, p. 777, also see above 'Siege of Antioch: Turkish Heads thrown over the Walls', p. 144-145; BD, p. 54 also see above 'Siege of Antioch: Bohemond's Speech', pp. 152-153.

The possibility that a reference to *balistae* in the Middle Ages is best interpreted as an instance of the use of a classical artillery type pushes this examination towards the debate surrounding the contentious use of classical torsion artillery types in the medieval world. This debate goes as far back as Köhler's 1890 work and continued through other crucial works such as Schneider's 1910 *Die Artillerie des Mittelalters* and Huuri's seminal 1941 work.[190] Though these major works in the field are somewhat dated, they have not been superseded. Köhler's conclusions leaned toward a late introduction of trebuchets and a long existence for torsion machines.[191] He was challenged by Schneider who argued for a complete break between ancient and medieval artillery typologies.[192] The debate surrounding this issue is set out well by Rogers.[193]

In that spirit, this examination will now turn to the evidence discussed in the First Crusade case studies to scrutinise the uses of the term *balistae*. There are numerous sources for the crusade that refer to *balistae* or equivalents. All the narrative sources of Robert the Monk, Raymond d'Aguilers, the *Gesta Francorum*, Albert of Aachen, Guibert of Nogent, Baldric of Dol and Ralph of Caen, as well as letters written by the people of Lucca, Stephen of Blois and Anselm of Ribemont, use the term in one manner or another. These various appearances have already been examined individually. This section will join the strands of those case studies together and analyse them in a larger context. The term occurs twenty-one times in the course of sixteen of the case studies examined above. Thus, it is a relatively common artillery term in the First Crusade sources but not the most common; the most frequently used term is *mangene*. Albert of Aachen used the term thirty-one times in the course of eighteen incidents during the sieges of the First Crusade.[194] It can be seen, therefore, that the frequency of *balistae* in the sources for the First

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[190] G. Köhler, *Die Entwicklung des Kriegwesens und der Kriegführung in der Ritterzeit von Mitte des 11. Jahrhunderts bis zu der Hussitenkriegen*, III (Breslau, 1890); R. Schneider, *Die Artillerie des Mittelalters*. K. K. Huuri, 'Zur Geschichte des mittelalterlichen Geschützwesensaus Orientalischen Quellen' *Studia Orientalia*, 9 (1941).
[191] G. Köhler, *Die Entwicklung des Kriegwesens und der Kriegführung*, pp. 140-221.
[192] R. Schneider, *Die Artillerie des Mittelalters*, pp. 1-26.
[193] R. Rogers, *Latin Siege Warfare in the Twelfth Century*, pp. 256-66.
[194] See below 'Appendix: Albert of Aachen's Artillery Nomenclature', pp. 325-343.

Crusade is not the most remarkable element of its usage: rather, attention must be turned to the timing of the appearance of the term rather than how often, as it is here that many of the more tangible clues to the nature of the term lie.

Of the twenty-one references to *balistae* in the course of the crusade, a significant majority occur before the crusade had moved on from the vicinity of Antioch. The term appears eleven times at Nicaea and six times over four case studies from Antioch with a further example occurring in Albert of Aachen's account of the actions of the crusade in the aftermath of the capture of Antioch before the march south.[195] There is another reference in the course of the siege of Ma'arrat-an-Numan.[196] The final references come from Ralph of Caen's account of the siege of Jerusalem and a section of Guibert of Nogent's work recording the role of the Tafurs in that siege.[197] There are no references during the siege of 'Arqah. There is, therefore, of a strong concentration of references to *balistae* in the early sieges of the campaign and uses of the term dwindle in frequency in the accounts of the later periods of the campaign. This pattern is not replicated in the use of other artillery terms in the First Crusade sources. Perhaps more striking than this is the pattern evident in both Albert of Aachen's and Robert the Monk's accounts of the

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[195] Siege of Nicaea: RM, pp. 756, GN, p. 145, also see above 'Siege of Nicaea: Construction of Equipment by the Crusaders on Ascension Day', pp. 108-110; Stephen of Blois, p. 139, also see above 'Siege of Nicaea: Battle against Kilij Arslan', pp. 111-113; Rd'A, p. 19, also see above 'Siege of Nicaea: Defenders' Artillery', pp. 117-119; GN, p. 146, RM, p. 757, also see above 'Siege of Nicaea: Heads Thrown into the City' 119-124; GF, p. 183, BD, p. 27 GN, p. 146, also see above, 'Siege of Nicaea: Missile Protection for Underminers', pp. 125-129; AA, p. 120, also see above, 'Siege of Nicaea: Alternative Siege Tactics Applied to Nicaea', pp. 130-131; GN, p. 153, also see above 'Siege of Nicaea: The Aftermath of the Siege', pp. 131-133. Siege of Antioch: RM, pp. 775, also see above 'Siege of Antioch: Building of Equipment by the Crusaders', pp. 134-137; RM, p. 777, also see above 'Siege of Antioch: Turkish Heads Thrown over the Walls', pp. 144-145; People of Lucca, p. 166, Anselm of Ribemont, pp. 158-9, also see above 'Siege of Antioch: Construction of Mahomerie's Tower, Counter-Fortification', pp. 146-148; BD, p. 54, also see above 'Siege of Antioch: Bohemond's Speech', pp. 152-153; AA, p. 298, also see above 'Siege of Antioch: Defence of Mahomerie's Tower against Kerbogha', pp. 153-155. Aftermath of Antioch: AA, p. 356, also see above 'Aftermath of Antioch: Godfrey's Attack on Pakrad', pp. 161-164.
[196] BD, p. 84; also see above 'Siege of Ma'arrat-an-Numan: Defenders' machine to attack siege-tower', pp. 167-174.
[197] RC, p. 693, also see above 'Siege of Jerusalem: Building of Equipment by the Crusaders', pp. 184-185; GN, p. 311, also see above 'Siege of Jerusalem: The *Tafurs*', pp. 212-213.

crusade. Albert's pattern follows quite closely the overall trend in having one reference each at Nicaea and Antioch and also including the one from the period immediately following Antioch. He then discontinued use of the term until later in the narrative when, after the siege of Jerusalem, it reappears once each at the sieges of Arsuf (1099), Haifa (1100) and 'Arqah (1108).[198] The term does not appear once in the *Historia Ierosolimitana* during any of the sieges of Ma'arrat-an-Numan, 'Arqah or Jerusalem despite detailed examples and twenty-six references to *mangene* and one reference to a *tormentum* in those sieges.[199] When one also considers that Albert of Aachen had a clear preference in his work for referring to *mangene* when dealing with artillery, his occasional deviations from that preference deserve attention and especially when they only digress at certain points of the work.[200] The trend is highlighted when one considers the nomenclature in Robert the Monk's *Historia Iherosolimitana*; for the first part of the crusade he refers to *balistae* almost uniquely to describe artillery in the sieges of Nicaea and Antioch with only one reference to *fundae* appearing alongside a reference to *balistae*.[201] He then switched to *tormenta* for both of the references to artillery in the period after the siege of Antioch. Both of these later references occur during the siege of 'Arqah. Despite having relatively few references to artillery in his work, only seven overall, Robert the Monk's nomenclature makes a clear switch after Antioch. The presence of a general pattern visible across so many sources strongly suggests that there may have been more going on here than simply a coincidence of terminology. The arrangement of the uses of the term point toward there being a definite connection between the term used by the sources and the typology of the artillery used on the ground in the sieges of the First Crusade.

It has been established in this section that there is more than one case in the course of the First Crusade where the term *balistae* or an equivalent is used to refer

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[198] AA, pp. 488, 514, 774.

[199] *Ibid.*, p. 376 – *mangenarum, mangenarum*; p. 406 – *mangenarum, mangenas*; p. 408 – *mangenarum, mangenarum*; pp. 414-6 – *mangenarum, mangenarum, mangenarum*; p. 416 – *mangenarum*; p. 422 – *mangene, mangene*; p. 422 – *mangenarum, mangenis*; pp. 422-4 – *mangenarum, mangenas*; p. 426 – *mangenarum, mangenas, mangene, mangene, mangenis, mangenarum*; p. 426 – *mangenarum*; pp. 426-8 – *mangene, mangenarum*; p. 422 – *tormento*.

[200] See above, 'Albert of Aachen', pp. 59-65.

[201] RM, pp. 756, 757, 775, 777.

to artillery. Alongside this there are a limited number of cases in which the term is very unlikely to do so and more likely refers to crossbows. A third situation exists with the few cases for which there is not enough ancillary evidence to postulate what exactly the term referred to. This leaves a somewhat confused nomenclature with at least a dichotomous split in meaning. It is nonetheless a situation in which the majority of the cases for which a solid interpretation of the use of the term *balistae* is possible the evidence points to its use as an artillery term rather than to denote crossbows.

As stated earlier, the mere presence of the references to *balistae* in the First Crusade narratives is not sufficient to identify the described object as a classical artillery piece. A number of cases have been shown where the item to which the term referred was either probably or definitely an artillery piece. Even this, however, is not enough on is its own to prove the exact morphology of the artillery pieces in question. More evidence is necessary if one is to make the case that, when the term *balista* is used for artillery, it is very likely to indicate a particular kind of late classical artillery. As has been shown earlier, there is a definite connection between the term and the classical artillery piece and, through the work of Vegetius, a connection that lasted into the Middle Ages. That only suggests a meta-trend, however, and does not confirm the presence of that particular artillery type in any individual cases such as those case studies examined above. More evidence is needed to prove, suggest or deny the presence of classical *balistae* at the sieges of the First Crusade. There is a trend visible through the accounts of the First Crusade that suggests that there was something unique about the artillery pieces designated *balistae*. At various points in the course of the sieges of the crusade, every other major term for artillery used in the sources is connected, at one point or another, with the throwing of rocks.[202] The term *petraria* has in its very nature a connection

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[202] The connection between artillery pieces can be seen in many of the case studies examined above. The following are the references for the case studies and the relevant quotations from the sources to illustrate the occasions where the throwing of stones was directly connected to a named type of artillery: 'Siege of Nicaea: Construction of Equipment and Attacks on the City following the Battle', pp. 113-117, AA, p. 110 '*tormenta*' and FC, pp. 186-7, '*tormentis*'; 'Siege of Nicaea: Defenders' Artillery', pp. 117-119, AA, p. 110 '*emissi lapidis*'; 'Siege of Nicaea: Count Raymond's Artillery Assault on a Mural Tower', pp. 124-125, AA, p. 112 '*tormentis lapidum que uulgo dicuntur mangene*'; 'Siege of Ma'arrat-an-Numan:

with rocks (*petra*). In a single instance during the siege of Jerusalem, Raymond d'Aguilers' account connected both *tormenta* and *petrariae* with the throwing of rocks.[203] Furthermore, that is not an isolated mention of *tormenta* throwing rocks; the same source, Raymond's *Historia Francorum*, also refers at another point to *lapides excussi a tormentis* and Robert the Monk connects the death of Pontius Balonensis to *tempora perforavit ictus lapidis tormento jaculati*.[204] The common term used by Albert of Aachen for artillery, *mangena*, also has numerous connections with the throwing of stones. At the siege of 'Arqah, Albert of Aachen makes a link between *instrumenta mangenarum* and *moles lapidum in impetu iactantium per turres et antiqua muralia*.[205] Even the more generic terms for siege equipment that are occasionally used to denote artillery are connected to the throwing of rocks at various points during the crusade. The term *instrumenta* is used in this manner.[206] This is not the case for *balistae*, however. Despite being used on six occasions in a manner that has been identified in this work as denoting artillery use and a number of other times in more ambiguous fashions, the term *balistae* is never associated with the throwing of rocks. It is not simply that all the other terms are associated with throwing stones or rocks at one point or another during the narrative of the crusade. The sheer volume of references to the throwing of stones both by engines identified by specific names as well as by machines to

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Defenders' machine to attack siege tower', pp. 167-174, Rd'A, p. 173 '*tormentis*', GF, p. 404, '*instrumentum*', PT, p. 92 '*instrumenta*', RM, p 846 '*instrumentum*'; 'Siege of 'Arqah: Crusader Equipment', pp. 174-180, AA, p. 376 '*instrumenta mangenarum*'; 'Siege of 'Arqah: Defenders' equipment', pp. 180-182, AA, p. 376 '*mangenarum*'; RM, p. 857 '*tormento*'; Rd'A, p. 200 '*petrarias*'; 'Siege of Jerusalem: Artillery Involvement in Siege-tower attack', pp. 194-209, AA, p. 422 '*mangenarum*', AA, pp. 422-4 '*mangenarum*', AA, p. 424 '*mangenis*', AA, p. 424 '*mangenas... fundibulis aut paruis mangenellis*', Rd'A, p. 338 '*tormentis*'; 'Siege of Jerusalem: The Death of *Duae Mulieres*', pp. 210-212, Rd'A, p. 342 '*petrariam... tormento*'.

[203] Rd'A, p. 342, also see above, 'Siege of Jerusalem: The Death of *Duae Mulieres*', pp. 210-212.

[204] Rd'A, p. 338, also see above, 'Siege of Jerusalem: Artillery Involvement in Siege-tower attack', pp. 194-209; RM, p. 857, also see above, 'Siege of 'Arqah: Defenders' equipment', pp. 180-182.

[205] AA, p. 376, also see above, 'Siege of 'Arqah: Defenders' equipment', pp. 180-182.

[206] GF, p. 404, '*instrumentum*', PT, p. 92 '*instrumenta*', RM, p 846 '*instrumentum*', also see above, 'Siege of Ma'arrat-an-Numan: Defenders' machine to attack siege tower', p. 167-174; AA, p. 376 '*instrumenta mangenarum*', also see above, 'Siege of 'Arqah: Crusader Equipment', p. 174-180.

which only a generic title is applied is also noteworthy. There are numerous references in the various crusade narratives to this phenomenon.[207] It is interesting that the only term for which this case of affairs does not apply is the term, in its classical sense, did not fire stones but, rather, fired bolts – *spicula* in the terminology of Vegetius. Of course, it is possible that this is the mere consequence of serendipity or happenstance but the weight of evidence certainly suggests that the *balistae* of the First Crusade sources did not fire stones. This point is strengthened, however, by a section of Baldric of Dol's *Historia* which connects *balistae* and the throwing of *spicula*.[208] In this particular incident, however, the term *balistae* cannot be definitively connected to artillery though nor can such a connection be ruled out. Taking both this and the the historical nature of the term into account, it would be reasonable to look upon these incidents as examples of the presence of *balistae* in the late classical sense of the word.

Thus it is evident that the occasions in the sources that use the term *balistae* or an equivalent are likely to be accurate in that usage and that there is significant indirect evidence to suggest that they did indeed use the term in the sense it was used by Vegetius and in the late classical period. Therefore it is reasonable to argue that artillery nomenclature in the primary sources for the First Crusade was largely accurate and technical, especially with regard to the use of the term *balistae*. It still remains, however, to reconcile this argument with the other usage of the term. At a number of points in this study, the nature and context of the use of the term *balistae* is such that either the weapons in question could just have easily have been crossbows as artillery pieces or that they were more likely to have been crossbows than artillery pieces.[209] There are, therefore, two possible meanings for the same

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[207] See above, n. 202, p. 220 for a list of the occasions where various artillery pieces are connected to the throwing of rocks.

[208] BD, pp. 84-5, also see above 'Siege of Ma'arrat-an-Numan: Defenders' machine to attack siege-tower', pp. 167-174.

[209] Stephen of Blois, p. 139, see also above 'Siege of Nicaea: Battle Against Kilij Arslan', pp. 111-113; AA, p. 356, see also above 'Aftermath of Antioch: Godfrey's Attack on Pakrad', pp. 161-164; GF, p. 183, see also above 'Siege of Nicaea: Missile Protection for Underminers', pp. 125-129; People of Lucca, p. 166 and Anselm of Ribemont, pp. 158-9, see also above 'Siege of Antioch: Construction of Mahomerie's Tower, counter-fortification', pp. 146-148; AA, pp. 296-8, see also above, 'Siege of Antioch: Defence of Mahomerie's Tower against Kerbogha', pp.

term in the First Crusade narratives. On the face of it, they would seem to present a paradox. The sources use the same technical term to denote two different machines but have a system and structure in place that allows for both to be true: a structure that is visible across sources. The two mechanisms that are covered by the term, however, are very similar and it would appear that the only difference is one of size. It is possible therefore that the usage of the term *balistae* was, for some authors, analogous to something like the modern term 'gun'. 'Gun' indicates a weapon that fires a missile presumably using gunpowder in its projection (though this need not be the case with more modern usages of the term wherein 'gun' has become a more wide-ranging term). 'Gun' defines nothing about size: it gives a sense of the weapon being discussed but does not state directly whether the user is referring to a hand-held pistol or a railway gun. It appears from its usage in the First Crusade texts that *balistae* may have had a similar usage in the Middle Ages. It denoted a weapon with a particular mechanism for firing its projectiles but it does not identify whether the weapon was a large artillery piece operated by a crew of men or a smaller crossbow operated by an individual; rather, both these meanings would appear to be interchangeable for the term.

Another element to the debatable nature of the term *balista* is the apparent different treatment of the term by authors primarily concerned with European affairs and those who concentrated on the crusades. It has been shown that several important authors based in Europe and writing about European affairs seem to use the term to indicate the presence of crossbows.[210] This is in contrast to the crusade sources that can be seen to have frequently used the term indisputedly as a term to denote artillery. Though there are also many debatable uses of the term, when a clear meaning can be taken from the use of the term in those crusade works it is far more often used to denote artillery than crossbows.

The pattern of the appearance of this term raises another issue. Was there any particular reason for references to *balistae* to have been concentrated in the

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153-155; RC, pp. 692-3, see also above 'Siege of Jerusalem: Artillery Involvement in Siege-Tower Attack', pp. 194-209.

[210] See above, pp. 'Western European Artillery Terminology in the Eleventh and Early Twelfth Centuries', pp. 93-104.

accounts of the sieges of Nicaea and Antioch? One obvious element that these two sieges had in common is that they constitute the part of the First Crusade for which there was Byzantine involvement in events. The Byzantines were present in a capacity that led to the provision of very important aid to the crusaders. We know that they provided boats for the blockade of the lake to the west of Nicaea, an action that was intrinsic in bringing about the fall of the city. Anna Comnena's account of the First Crusade would lead one to believe that the Byzantines had yet more important involvement than this.

> The Emperor, who had repeatedly and accurately thought out the matter, realised that it would be impossible for the Latins to take Nicaea, even if they had forces without number, so in the meanwhile he had various sorts of siege-engines built, and most of them not according to the usual designs of the mechanics but on other lines he had thought out himself - a thing which amazed people – and these he sent to the Counts.[211]

This advances the possibility that the presence of Byzantine aid had some bearing on the presence of *balistae* in the crusader forces.

As already mentioned, there is a debate over whether certain types of artillery from the classical period continued to be used in the Middle Ages and the *balistae* falls into the category of the machines that are debated in that manner.[212] It would make sense, however, that if *balistae* continued in use from the late Roman period, that the most likely place for them to survive would have been the Roman Empire in the East, the Byzantine Empire. The likelihood of such technological continuation, into the tenth century at least, was indicated by Oman in his classic military history, *The Art of War in the Middle Ages*.[213] The lack of organised siege trains on the march of the crusade meant that each siege provided a blank canvas for the construction of siege-machinery. The crusaders had enough problems transporting themselves across Aisa-minor without moving large pieces of equipment with them. Thus, it would be possible for the Byzantines to have built a

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[211] Anna Comnena, *The Alexiad*, ed. E. R. A. Sewter, (London, 1969, reprinted 2003), pp. 335-6. For the original Greek see Anna Comnena, *The Alexiad*, RHC Grecs, I, part 2, p. 40.

[212] See above, 'Introduction', pp. 8-10.

[213] C. Oman, *The Art of War*, p. 55. Oman makes that point here but does so without providing precise evidence.

balista or *balistae* for the crusaders or aided in their construction and for those *balistae* not to have been available to the crusaders in the sieges following the departure of Byzantine aid, as they had to build anew at later sieges.

There are problems for this possible interpretation. Anna Comnena's account was written forty years after the events of the First Crusade and was composed with the intention of promoting the legacy of her father, Alexius I Comneus.[214] Consquently, this passage could be read as an attempt to promote his involvement in a successful campaign after the event. None of the Christian sources for the crusade mention the provision of major siege equipment by Alexius and France has suggested that Anna exaggerated the extent to which Alexius provided military aid.[215] Although there is a pattern to the nature and timing of the appearance of *balistae* in the crusade narratives, it is such that it invites doubt. Only the accounts of Robert the Monk and Albert of Aachen use the term early on in the First Crusade and not at all in the later sieges. In other accounts, though most references to *balistae* appear in the earlier sections of their works, also contain a limited number of references to such machines at the sieges of Ma'arrat-an-Numan and Jerusalem. Overall, the possibility that the Byzantines provided such machines to the crusaders is one that would furnish modern readers with a feasible interpretation of the situation but it is not one that has a large body of firm evidence to back it up and as such it must remain a conjectural rather than a concrete answer to the problems posed by the term *balistae*.

As well as the possible presence of *balistae* in the First Crusade, there is evidence for the presence of traction or hybrid trebuchets during the First Crusade. This is most evident in Peter Tudebode and Albert of Aachen's accounts of the death of a captured messenger. The need of for the application of human strenth in the operation of the weapon involved as well as its limited power combine to point to one of those two machines being involved in that action.[216] That is not an isolated incident, however, and there are other mentions of artillery in the First Crusade

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[214] J. France, 'Anna Comnena, the Alexiad and the First Crusade', *Reading Medieval Studies*, 10 (1983), pp. 20, 21.
[215] *Ibid.*, p. 26.
[216] PT, p. 107, AA, pp. 420-2; also see above 'Siege of Jerusalem: Messenger/Spy thrown toward city', pp. 185-189.

accounts that point toward the presence of such trebuchets.[217] Furthermore, during his account of the siege of Jerualsem, Raymond d'Aguilers referred to the use of *tormentis atque petrariis*.[218] Although problematic, this use of two artillery terms in the one incident may indicate that the crusaders had two or more types of artillery in operation simultaneously.

GENERAL TERMS

Some of the terms employed by the First Crusade sources to denote artillery were used in such a manner as to make it clear that they are best seen as general terms, as terms used to signify the presence of an artillery piece or pieces but not a specific type of artillery. The clearest examples of this occurence are visible when terms such as *machina* and *instrumentum* were employed to indicate artillery. Raymond d'Aguilers' reference to *machinae impetus* and the use in the *Gesta Francorum* of *instrumentum* in the course of the siege of Ma'arrat-an-Numan both illustrate this phenomenon well.[219]

Less clear instances than the examples of *machinae* and *instrumenta* are also to be found in the sources. Albert of Aachen's mention of *duobus tormentis lapidum que uulgo dicuntur mangene* during the siege of Nicaea is one such instance.[220] It is problematic to point to one of the two artillery terms used here, *tormenta lapidum* and *mangena*, as a certain example of a general term; certainly it can be pointed out that *mangena* is stated to be what the *tormenta lapidum* were 'generally' or 'regularly' (*uulgo*) called. A case can be made, however, for either term being a qualifier for the other. The makeup of the phrase *tormenta lapidum* is

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[217] See above 'Siege of Nicaea: The Aftermath of the Siege', pp. 131-133 and 'Siege of Antioch: The Treatment of the Christians Within Antioch', pp. 148-152.

[218] RdA, p. 338, also see above 'Siege of Jerusalem: Artillery Involvement in Siege-tower attack', pp. 194-209.

[219] Rd'A, p. 19, also see above, 'Siege of Ma'arrat-an-Numan: Defenders'Artillery', pp. 117-119; GF, p. 404, also see above, 'Siege of Ma'arrat-an-Numan: Defenders' machine to attack siege tower', pp. 167-174; the *Gesta Francorum's* use of the term was picked up and reused by both Peter Tudebode (PT, p. 92) and Robert the Monk (RM, p. 846).

[220] AA, pp. 112, also see above, 'Siege of Nicaea: Count Raymond's Artillery Assault on a Mural Tower', pp. 124-125.

interesting. The phrase itself gives some information about the machines in question. Clearly the missiles fired from those machines were stones (*lapides*). As well as this, the word *tormentum* has the sense of a machine that fires missiles. Even if a contemporary reader was not aware of the prior use of the term to denote artillery, the nature of the phrase is such that it tells that the machines in question throw or 'twist' stones. Thus, it can be argued that Albert of Aachen was trying to convey the information that these were stone-throwers (indicated by use of the term *tormenta lapidum*) which are commonly and, perhaps, technically known as *mangene* to the Germans.[221]

Problems are presented by Raymond d'Aguilers' account of the death of *duae mulieres* towards the end of the siege of Jerusalem. When describing that incident Raymond made two references to one piece of artillery, using two different terms in the process. He referred to the machine firstly as a *petraria* and then as *eodem tormento*.[222] It is noteworthy that the term *tormentum* again raises its head in an incident where there is some possible confusion over the exact meaning of terms and the possible use of a term in a very general manner. Fulcher of Chartres writing about equipment constructed at the siege of Nicaea used two different terms for artillery in close proximity when he reported that *petrariae* had been constructed then, almost immediately, stated that *tormentis iaculabantur lapides*.[223] There is little information about the form of the machines mentioned except the recurring reference to these machines firing rocks, which is relayed by both the term *petrariae* as well as the direct statement from Fulcher that the *tormenta* that he mentioned *iaculabantur lapides*.

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[221] For a discussion of the German nature of the term *mangena*, see above 'Albert of Aachen', pp. 59-60.

[222] Rd'A, p. 342, also see above, 'Siege of Jerusalem: The Death of *Duae Mulieres*', pp. 210-212.

[223] FC, p. 186, also see above, 'Siege of Nicaea: Construction of Equipment and Attacks on the City following the Battle', pp. 113-117.

The information provided by the various First Crusade sources make it clear that there were a number of tactical options in the application of artillery pieces to the problems faced by the crusaders in overcoming the stout defences they encountered. There are three distinct uses that can be identified in the application of artillery during the First Crusade; there were two tactical options in which artillery pieces were used in attempting to cause physical damage to the cause of the defenders – firstly, attacking the defenders in an anti-personnel fashion and, secondly, attacking the structure of the defences. The third end to which artillery was employed was psychological warfare.

If it were necessary to establish a hierarchy of artillery uses, then in the First Crusade anti-personnel usage of artillery was clearly paramount. In measuring the effectiveness of artillery pieces in their anti-personnel capacity, it is important to recognise that it was not merely the killing of enemy combatants that was the aim but also preventing them from actively defending their walls and towers from the assaults of the besieging crusaders. One of the best examples of the sometimes-devastating power of the crusaders' artillery comes from Raymond d'Aguilers's account of the siege of Jerusalem. The literary framework of the incident – that there were women casting spells or cursing crusaders' machines – is unimportant: what is important is that a single stone fired from an artillery piece reportedly *mulieres carminantes cum tribus puellis parvulis allisit.*[224] It is unfortunate that the nature of the Christian sources is such that they do not show more interest in recording the death of enemies or less important crusaders by artillery. There are, however, numerous examples of important crusaders being killed by missiles propelled from artillery pieces: Baldwinus Calderun died at Nicaea, Anselm of Ribemont and Pons Balazun were killed at 'Arqah and an unmanned man standing next to Duke Godfrey was struck and killed during the siege of Jerusalem.[225] Given

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[224] Rd'A, p. 342; also see above, 'Siege of Jerusalem: The Death of *Duae Mulieres*', pp. 210-212.

[225] AA, p. 110; also see above 'Siege of Nicaea: Defenders' Artillery', p. 117-119. AA, p. 376; also see above, 'Siege of 'Arqah: Defenders' equipment', pp. 180-182. RM, p. 857; Rd'A, pp. 200-1; also see above, 'Siege of 'Arqah: Defenders' equipment', pp. 180-182. J. Riley-Smith identifies 'Pons of 'Balazun' (Balazuc?)'

that there are no references in the source to a significant difference between the typology of the crusader artillery pieces and those of the various enemy forces encountered in the course of the campaign, this omission could be used to tentatively suggest that there was no such difference and, consequently, one could hypothesize that the crusader artillery pieces probably had similar abilities to cause casualities. Even in instances where the artillery pieces caused no recorded casualities but, instead, kept the defenders off their walls, they must be considered an anti-personnel success. It can be seen at the siege of Antioch that when the crusaders occupied the city and were defending themselves from the forces in the citadel, they constructed a wall and utilised machines to defend themselves.[226] The fact that these artillery pieces were used defensively rules out an anti-structural function for them. They were used to prevent attacks from the citadel into the city and thus to control the men operating from and in the citadel. At the siege of Nicaea, the *Gesta Francorum* reported that *arbalistae et sagittarii* were employed in defending men undermining the city's walls from those who were defending those walls.[227] It is unclear whether or not the *arbalistae* mentioned were artillery pieces or crossbows but it is clear that they were used in an anti-personnel fashion. The possible *balistae* in Mahomerie's tower should also be seen as having been used in a purely anti-personnel fashion. The main aim of setting up that counter-fortification was to control sallies from Antioch.[228] A final example is the role that artillery pieces played in the siege of Jerusalem and in the final assault on the city. Albert of Aachen attributes much of the success in that assault to the actions and effectiveness of the *mangene* used by the crusaders. The *Historia Ierosolimitana* says that:

> Tres simul Christianorum *mangene* sine requie incessabili iactu menia transuolabant, et custodies hinc et hinc a minibus longo recessu

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only as noble and has not been able to make any further identification of the individual: J. Riley-Smith, *The First Crusaders*, p. 218. AA, pp. 424-5; also see above, 'Siege of Jerusalem: Artillery Involvement in Siege-tower attack', pp. 194-209.

[226] See above, 'Siege of Antioch: Equipment on wall between citadel and town following capture of town', pp. 156-161.

[227] GF, p. 183; also see above, 'Siege of Nicaea: Missile Protection for Underminers', pp. 125-129.

[228] See above, 'Siege of Antioch: Construction of Mahomerie's Tower, counter-fortification', pp. 146-153 and 'Siege of Antioch: Defence of Mahomerie's Tower against Kerbogha', pp. 153-155.

absterrebant. Ad hec fratres prenominati Litholdus et Engelbertus, uidentes Sarraceos ocio torpere et manus a defensione continere, et ex utroque latere menium procul absistere, propter *mangenarum* exteriorum impetum, sine mora, quoniam muro erant propiores, a secundo cenaculo in quo erant, porrectis arboribus et inmissis in menia, primum in urbem in uirtute armorum descenderunt, uniuersis murorum custodibus in fugam conuersis.[229]

The message is clear here that the *mangene* were crucial in clearing the walls of the defenders, thus allowing for *Litholdus* and *Engelbertus* to lead the storming of the walls. There is no clearer example in the sources of the importance and value of artillery when used in this anti-personnel capacity; Ralph of Caen in a slightly earlier section of his description of the siege of Jerusalem used the formula: *balearibus scilicet tormentis ad hostiles assultus.*[230] Albert of Aachen's account of the fall of Jerusalem is the only example in the course of the First Crusade of artillery being ascribed a major role in bringing about the end of a siege.

It is clear from the sources that the use of artillery to attack fortifications did not meet with much success during the crusade. Albert of Aachen's account of an attack on a mural tower by Count Raymond of Toulouse in the course of the siege of Nicaea is a case in point.[231] In that instance it was seen that the application of numerous artillery pieces to the task at hand, attacking the tower, led to minimal structural damage being caused. The outcome was replicated at Antioch where, once more, artillery pieces were employed to assault the stone defences of the city at the *Waiferii* Gate.[232] These attempts were a failure and the crusaders were forced to employ alternative methods in their attempts to stop the gate being used for sallies from the city. At Jerusalem the end result of using artillery to attack masonry defences was, once more, failure for the artillery pieces.[233] The case of Jerusalem provides a somewhat different situation from those in Nicaea and Antioch in that

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[229] AA, pp. 426-8; also see above, 'Siege of Jerusalem: Artillery Involvement in Siege-tower attack', pp. 194-209.

[230] RC, p. 691; also see above, 'Siege of Jerusalem: Equipment moved with the Tower around the City', pp. 190-194.

[231] AA, pp. 112-4, also see above, 'Siege of Nicaea: Count Raymond's Artillery Assault on a Mural Tower', pp. 124-125.

[232] AA, pp. 202-4; also see above, 'Siege of Antioch: Battle at *Waiferii* Gate', pp. 138-142.

[233] RC, pp. 692-3, AA, pp. 422-8, Rd'A, pp. 338-9; also see above, 'Siege of Jerusalem: Artillery Involvement in Siege-tower attack', pp. 194-209.

there are claims that the artillery had the ability to cause serious damage to the walls of the city. It has been shown above, however, that these claims must be treated with scepticism.[234] Thus the evidence from the First Crusade shows that the crusaders were certainly not averse to attempting to cause structural damage to defences with their artillery but their efforts to do so were less than successful. It was a tactical option often employed but one that cannot be said to have had any material impact on the outcome of any of the sieges of the crusade.

These are the most direct uses that were made of artillery; that is to say, they were the methods that were most likely to cause damage to the physical mechanisms of the defence. It should not go unrecognised, however, that there was another ancilliary use for these machines – instilling fear in the besieged. This is probably best illustrated by the death of a captured messenger or spy during the course of the siege of Jerusalem.[235] It cannot be said that the only purpose of this action was to execute the prisoner: had that been the case, there would surely have been much simpler methods available in the crusader camp. Rather this was a clear attempt to strike fear into the defenders of Jerusalem by showing what the crusaders were capable of. There are more examples from the sieges of Nicaea and Antioch of the crusaders utilising their artillery pieces in attempts to strike terror into their enemies: at both of those sieges there are accounts that tell of the flinging of heads over the walls.[236] The defenders of Antioch were not above this tactic either.[237] Presumably the aim in all of these incidents was to bring about the surrender of opposition forces through fear of what would befall them if they held out to the last against such demonstrably determined and ferocious opponents. These actions may not have played a role in the major, 'direct' attempts to capture any of the targets of the crusade's sieges or in physically subduing the garrisons of those targets but they

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[234] See above, 'Siege of Jerusalem: Artillery Involvement in Siege-tower attack', pp. 194-209.

[235] AA, pp. 420-2 and PT, p. 107; also, see above, 'Siege of Jerusalem: Messenger/Spy thrown toward city', pp. 185-189.

[236] At Nicaea, GF, p. 182, RM, p. 757, PT, p. 23, AA, p. 108, also see above, 'Siege of Nicaea: Heads Thrown into the City', pp. 119-124; For Antioch, RM, p. 777, AA, pp. 236-8, also see above, 'Siege of Antioch: Turkish heads thrown over the walls', pp. 144-145.

[237] AA, p. 210, also see above, 'Siege of Antioch: Captured Christians' Heads thrown from the City', pp. 142-143.

constituted a relatively common application of artillery in the course of the First Crusade.

This savage approach to warfare has parallels in the actions of the Normans in their campaigns in southern Italy and Sicily in the eleventh century. Bartlett has suggested that this ferocity was part of the Normans' attempts to announce their arrival and make their presence felt on the political scene as well as to make their enemies aware of their ferocity in warfare.[238] This explanation for the barbaric acts in southern Italy could also be applied to the actions of the crusaders that have been identified here as psychological warfare. The crusaders, much like the Normans in Italy, were new arrivals on the turbulent political scene of Outremer and it is clear that a number of them, particularly Bohemond of Taranto, were intent on carving out new land holdings for themselves in the territories they conquered while on crusade. Thus it is plausible to argue that they engaged in these demonstrative acts of barbarism to highlight their presence and to promote the idea of their bravery and ruthlessness in war so as to lessen resistance to their attempts to further their own aims.

There is, however, another element that must be factored into any interpretation of this phenomenon: this unrestrained violence may have been a direct consequence of the 'clash-of-cultures' element of the crusade movement – an element that might not have been wholly alien to the experiences of the Normans in southern Italy. There was a pronounced ignorance and disdain evident in the attitudes of the First Crusade forces toward the Muslim groups they encountered.[239] This, combined with the religious fervour surrounding the crusades could be argued to have led to an atmosphere that provoked feelings of hatred toward enemy forces. That atmosphere could, in turn, be argued to have given rise to an element of sadism and a desire to inflict emotional pain on adversaries even if doing so would

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[238] R. Bartlett, *The Making of Europe, conquest, colonization and cultural change, 950-1350* (London, 1993), pp. 86-8.

[239] J. A. H. Morgan Cruz, 'Popular attitudes toward Islam in Medieval Europe' in M. Frassetto and D. R. Banks, eds., *Western Views of Islam in medieval and early modern Europe: perception of other* (Basingstoke, 1999) pp. 62-3; D. C. Munro, 'The Western Attitude toward Islam during the Period of the Crusades,' *Speculum* 6, no. 3, (July, 1931) pp. 329-43.

not bring about any direct military gains. Such a brutal approach is also identifiable in other crusader actions such as the infamous slaughter of the defenders of Jerusalem following that city's capture in the summer of 1099.

Albert of Aachen noted that the throwing of heads into Antioch by the crusader forces and the setting of a reported two hundred heads on stakes or poles, placed them before the city were done *ad augendum Turcis dolorem* – to increase the pain or anguish of the Turks.[240] This explanation of the aims of the crusaders is important: it shows a desire to harm the defenders of Antioch mentally but there is no direct indication that either action was also intended to directly hasten the fall of the city. It should, however, be noted that, given the importance of mental fortitude in siege warfare, particularly with regard to the ability to remain firm in the face of determined opposition, any assault on the mental wellbeing of a group engaged in siege warfare must be treated as a potentially decisive action in determining the outcome of that siege. Furthermore, it can be seen in the later siege of Montferrat in 1138 that what might be termed 'regular' use of artillery – the bombardment of a besieged position with stone missiles – also had a psychological effect on those subjected to it. William of Tyre was clear in his depiction of the 'fear' engendered in those upon whom such an assault was foisted.[241] All use of artillery, whether throwing stones or more unusual missiles, should thus be seen as an action that had the potential to have a detrimental psychological impact on enemies and that such a psychological impact, in turn, had the potential to be important in determining the course of the siege.

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[240] AA, pp. 236-8.
[241] WT, p. 667; also, see below, 'Siege of Montferrat', pp. 293-294.

EXPANSION AND CONSOLIDATION: ARTILLERY USE FROM 1099 TO THE SECOND CRUSADE

There were several sieges and military engagements in and around the burgeoning crusader principalities in the period between the capture of Jerusalem in 1099 and the fall of Edessa in December 1144, which precipitated the calling of the Second Crusade. Not all these actions involved the use of artillery. Consequently, the sieges treated in this chapter do not constitute an exhaustive list of those that occurred in the period; rather comment is limited to those sieges that directly involved the reported use of artillery. The number of sieges for which one can be sure of the use of artillery is noticeably larger in the period for which Albert of Aachen remains available as a source, which is up until the 1111-12 siege of Tyre.[1] Albert's work is the most detailed for matters of artillery and, as a result, after the *Historia Ierosolimitana* finishes in the middle of the second decade of the twelfth century, there is a dearth of information on the use of these machines. The other major source for the period is Fulcher of Chartres's *Historia*, which continues to provide pertinent information on artillery as late as the 1126 siege of Raphina.[2] In addition, even though his account is reliant on the information provided by the works of Albert of Aachen and, to an even greater extent, that of Fulcher of Chartres, William of Tyre's vast chronicle of the history of the crusader states becomes

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[1] AA, pp. 828-32; also see below, 'Siege of Tyre (1111-1112)', pp. 275-279. For a discussion of the background to the work of Albert of Aachen's and his use of artillery terminology see above, 'Albert of Aachen', pp. 57-70.
[2] FC, p. 799; also see below, 'Siege of Raphina', pp. 291-293. For a discussion of the background to the work of Fulcher of Chartres and his use of artillery terminology see above, 'Fulcher of Chartres', pp. 50-57.

unavoidable in any discussion of this period.[3] Guibert of Nogent's *Dei Gesta per Francos* also continues for a short period into this era and provides some information on events at the siege of Caesarea.[4]

SIEGE OF ARSUF (1099)[5]

The siege of Arsuf took place from 15 October to 15 December 1099, following soon after the crusader capture of Jerusalem.[6] The city had already recognised Godfrey's overlordship but he wished for greater control over the port and decided to invest it. Godfrey's efforts failed, however, and the city was not captured by the Christian forces until 1101 when a force led by King Baldwin I succeeded in taking it.

CONSTRUCTION OF SIEGE ENGINES

Albert of Aachen, p. 486:

> Collocatis itaque undique tentoriis, aptaurent machinas et *instrumenta mangenarum*, spacio sex ebdomadarum ea fabricantes.

The description here of the crusader forces constructing artillery pieces at the outset of the 1099 siege of Arsuf is only revealing in a very limited sense. The description of the artillery pieces as *instrumenta mangenarum* is entirely unsurprising in Albert of Aachen's work as it employs the same terminology as has been seen time and again in the course of his descriptions of sieges. It may perhaps be taken to indicate a continuity in machinery between the siege of Jerusalem, earlier in the same year, and this siege at Arsuf but it says little new about the artillery of the crusaders. What is noteworthy in this short description of the

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[3] For a discussion of the background to the work of William of Tyre and his use of artillery terminology see above, 'William of Tyre', pp. 82-92.

[4] For a discussion of the background to the work of Guibert of Nogent and his use of artillery terminology see above, 'Guibert of Nogent', pp. 37-46. For analysis of Guibert's description of artillery in the siege of Caesaera see below, 'Siege of Caesarea (1101): Preparation for the Siege and Initial Actions', pp. 242-245.

[5] S. Runciman, *A History of the Crusades*, I, pp. 308-9.

[6] H. Hagenmeyer, *Chronologie*, p. 272.

construction of siege engines is the length of time involved in the process. Albert of Aachen informs us that six weeks (*sex ebdomadarum*) were spent in this endeavour. Even though it was not only artillery that was constructed at this juncture, one can deduce from the information available here that the construction of these artillery pieces was, unsurprisingly, a time consuming and involved process.

ASSAULTS ON THE CITY

Albert of Aachen, p. 488:

> ... urbis defensores in sagittis et *fundibulis* et *mangenellis* circumquaque impugnantes

It is unfortunate that Albert's recounting of these assaults was not accompanied by a description of their effectiveness. This statement is somewhat isolated in the description of the siege and one is left to wonder at the success of the crusaders in these attempts to bring about the fall of Arsuf. It is noteworthy, however, that these various weapons, *mangenella*, slings and arrows, were directed against the defenders of the city rather than against the defences themselves. The *mangenella*, as well as the stones and arrows shot from other weapons, were used in an anti-personnel maner in this siege. This brief mention does nothing to enhance the understanding of these *mangenella*, or small *mangene*, which have been discussed elsewhere.[7]

It has been discussed above, that when the term *fundibula* appears in Albert of Aachen's work there is little to indicate that this was a reference to an artillery piece of note. Rather, these usually appear to be slings wielded by a single operator.[8]

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[7] For a discussion of the difference between *mangenella* and *mangene* in Albert of Aachen's *Historia* see above, 'Albert of Aachen', pp. 59-65.

[8] See above, 'Albert of Aachen', p. 69.

Albert of Aachen, p. 488:

> ... ab intus *mangenis, balistis* et sagittis uiriliter resistentes, urbem in machina expugnantes milites ducis expugnare nitebantur. Palos enim ferreos et acutos, oleo, stuppis, pice immixta inuolutos, ignis fomite omnino aqua inextinguibilis creberrima iaculatione *machine* a menibus intorquebant, trans taurina coria, quibus uiminee et uitee crates operte errant, ad excutiendos ingeatos ignes. Sed tandem, paulatim flamma suscitata, et uires undique in arida materie rapiente, tota machine combusta humi procumbens corruit, cum tribus cenaculis.

This is a crucial incident at the siege of Arsuf as it provides the first appearance of *balistae* in the post-First Crusade period. Vis-à-vis artillery, there are two elements to separate here. The *mangene, balistae et sagittae* were being used by the besieging crusaders to assault the defenders whereas the defenders had a *machina* of their own which fired *palos enim ferreos et acutos*. These two elements, the artillery of the attackers and that of the defenders, will be discussed presently, in that same order.

The nature of the *balistae* mentioned here is debatable. As always with this term there is a problem associated with its interpretation. Is it best rendered as an artillery piece, possibly in the sense of a classical *balista*, or as a crossbow? Sandwiched between references to a clear artillery, *mangene*, on one side and a definitely personal missile weapon, arrows, on the other, there is no clear indication which of these weapons, if either, which Albert was comparing to the *balistae*. As a result, rather than base an identification of the weapon type on the limited evidence and conflicting nature of this reference, one must instead look to the use of the term *balistae* across the entirety of Albert's *Historia Ierosolimitana*. The term *balistae* appears on six occasions in Albert's work.[9] The nature of some of these appearances of the term is ambiguous but there is one occasion in particular wherein the appearance of the term is accompanied by a concrete sense that the weapons referenced were artillery pieces rather than crossbows. This occurred during Albert's description of the measures taken at the siege of Nicaea that had

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[9] AA, pp. 120, 298, 356, 488, 514, 774; for a discussion of Albert's overall treatment of the term *balistae* see above 'Albert of Aachen', pp. 65-69.

failed to capture the city. The use of *balistae* appeared on the list alongside powerful assaults (*impetus uirim*) on the walls and the use of other siege engines (*machinae*).[10] In addition, the mention of *balistae* in the build up to the siege of Haifa is one of the elements, which, alongside *machinae*, allowed the attackers to besiege the city *mari et terra*.[11] In these instances it is clear that these were not small arms. Thus, there is a possibility throughout Albert's *Historia* that his use of the term *balistae* refers to artillery pieces, even on the occasions, such as that under discussion, where there is doubt about the nature of the weaponry in the incident. The *mangene* that can be seen being employed by the crusaders, on the other hand, can be deciphered quite clearly. These are artillery pieces and they are depicted in the same manner as the *mangene* mentioned by Albert in the previous case study. They are shown being used in an anti-personnel capacity, attacking the defenders of the city rather than the structure of the city's defences.

The *machina* employed by the defenders is intriguing. It was clearly an artillery piece and one of a sort that Albert of Aachen deemed worthy of a description in his *Historia*. Most of the passage detailing the piece is a description of the missiles fired by it. The projectiles are described as *palos enim ferreos et acutos* that were covered with *oleo, stuppis, pice immixta*. This combination of materials was designed to create a fire that could not be extinguished by water. To discover the morphology of the machine in question, attention must be directed not at the ingredigents for the fire, however, but at the *palos enim ferreos et acutos*. The key element from this phrase is the *pali*. This machine was firing something akin to a 'stake.'[12] This may then point to an identification of a machine in the form of a *balista*, which would fit well with a machine that shot poles, items that would have possessed a similar morphology to a spear or javelin. This raises, however, an important question. Given that Albert was undoubtedly familiar with the term *balista*, would he have given this machine this more detailed description and the generic title *machina*, if it was compatible with the structure of a *balista*? This is improbable. Either, therefore, the *machina* in question was an engine that differed

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[10] AA, p. 120; see also, 'Siege of Nicaea: Alternative Siege Tactics applied to Nicaea', pp. 130-131.
[11] AA, p. 516; see also, 'Siege of Haifa: Preparation for the siege', pp. 240-241.
[12] C. T. Lewis and C. Short, *A Latin Dictionary*, p. 1295.

in form from a *balista* but which shot a similar type of missile; or Albert, though familiar with the word *balista*, was not *au fait* with the classical type of artillery that was termed a *balista*. If the latter case of affairs were true, Albert would not be alone in using *balista* to refer to a missile weapon that was not a large artillery piece but rather a weapon operated by a single soldier, in the form of a crossbow or similar weapon. This, however, would also be an irrational conclusion, as the case of the uses of the term *balista* at Nicaea and Haifa, mentioned above in the previous paragraph, indicates that Albert of Aachen did, on occasion, use the term to indicate large artillery pieces.[13] Thus the first possibility set out above remains but, concerning the second, one cannot use this incident to suggest that when Albert used the term *balista*, he was referring to crossbows. There is, however, a lack of evidence from which to form a solid conclusion whether Albert was referring to a bolt-throwing machine of a different form from a *balista* or whether he was simply not conversant with the classical sense of the term.

Siege-Tower Assault

Albert of Aachen, p. 492:

> Ac rursum machinam componentes et *tormenta lapidum*, longa tempora circa muros expleuerent... [siege-tower brought forward] simili iaculatione palorum igitorum ut priorem machinam Sarraceni infixerunt, quosuque leni aura flamma susicitata inualenscens

Albert of Aachen's *tormenta* in this incident are definitively identified by the text as stone throwing machines by the accompanying word *lapis*. On the other hand, neither the target of these *tormenta* nor their effectiveness in the course of the siege is mentioned here. There is, however, a clear cooperation and coordination evident between the efforts made to bring the power of a siege-tower (referred to in this extract as a *machina*) to bear on the walls and the efforts of the *tormenta lapidum*. As was the common approach of this era, the artillery pieces seem to have played an ancillary role as support to the siege-tower, which was the main hope for

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[13] AA, p. 120; see also, 'Siege of Nicaea: Alternative Siege Tactics applied to Nicaea', pp. 130-131 and AA, p. 516; see also, 'Siege of Haifa: Preparation for the siege', pp. 240-241.

bringing about the fall of the city. Albert also mentions that the defenders of Arsuf once again employed the machine described in the immediately previous case study that shot flaming *pali* in an attempt to burn the siege engines of the attackers. The information provided in this case study does not, however, expand on that provided on that particular machine in the case study above.

SIEGE OF HAIFA (1100)[14]

The siege of Haifa, a costal town controlled by Fatimid forces, was undertaken by Tancred with the aid of a Venetian fleet. The siege was begun on 25 July and ended with the fall of the city to the Christian forces on 20 August 1100.[15] The capture of the city represented one of the earlier instances of a crusader success in the expansion of the area under their control following the siege of Jerusalem.

PREPARATION FOR THE SIEGE

Albert of Aachen, p. 516:

> Aptatis siquidem ingeniis quibus Cayphas uinceretur, in terra et mari, ... [Then they got word that Duke Godfrey had died so they abandoned the siege and went to Jerusalem only to discover that the news was false; Godfrey comforted them and they departed to renew the siege] Et post dies quindecim cum omni opere machinarum et *balistarum* profecti, mari et terra Caiphas applicuerunt

This is one of two incidents, alongside the use of the term *balistae* at Nicaea, that strongly suggests that Albert of Aachen, when employing that particular term, did so in the sense of an artillery piece rather than as a crossbow. In this instance, the role of the *balistae* clearly ranks alongside the *machinae* that made it possible to besiege the city by both land and sea. It stands to reason that if Albert used the term to indicate crossbows, there are no evident grounds for him not to have listed also all sorts of other individual weapons from *arcus* to *gladii*. These introductory

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[14] S. Runciman, *A History of the Crusades*, I, pp. 316-7.
[15] H. Hagenmeyer, *Chronologie*, pp. 309, 316-8.

references to the siege do not, however, provide any detailed information about the manner in which these artillery pieces were used.

SIEGE-TOWER AND ARTILLERY ASSAULT ON THE CITY

Albert of Aachen, p. 516:

> Quam mari et in sicco obsederunt, in machina mire et procere altitudinis, in *tormentis lapidum* septem que uocant *mangenas*, ad expugnandos urbis defensores euisque habitatores. Applicatis itaque muro ingeniis cum ingenti machina, et undique graui assultu eam uiris Gallie obpugnantibus, ciues ex genere Iudorem, qui hanc inhabitabant dono et consensus Regis Babylonie in redditione tributorum, in armis et minibus exurgentes, multum in defensione obstiterunt, quousque Christiani uariis plagis grauati per dies quindecim prorsus diffisi ab omni assultu manus suas continuerunt.

The first element of this extract, which identifies clearly a type of artillery that was used in the course of this assault, is that the *balistae* mentioned above by Albert of Aachen as used in establishing the siege are not mentioned. This does not, however, mean that they were not present at the siege or that Albert was factually incorrect to mention them earlier in his account of the siege. It is possible, though not verifiable, that *balistae* were brought by the crusaders to the siege but that they were less useful than the *mangene* that were later built on site and then used in the course of the siege-tower assault.

There are four points to be made about this appearance of Albert of Aachen's ubiquitous *mangene*. Firstly, these artillery pieces are linked to the *tormenta lapidum*, thus indicating that the *mangene* in question threw rocks. The use of these two terms in tandem seems to point to one of them being a general term and, as has been discussed elsewhere, *tormenta* fits that role well.[16] Secondly, this is a sizable artillery battery. The reported use of seven artillery pieces dwarfs many of the batteries reported to have been used by the crusaders at any of the earlier sieges in which they were involved. At the 1099 siege of 'Arqah, for example, it was reported by Ralph of Caen that the crusading forces employed three pieces of

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[16] See above, 'Albert of Aachen', pp. 62-65.

artillery one built by each of Robert of Normandy, Raymond of Saint-Gilles and Tancred.[17] In that case the crusaders spent two months around the walls of the city (in an unsuccessful siege) with a force of unprecedented size and yet only three artillery pieces are reported to have been built. Even bearing in mind that the size attributed to this battery may have been an exaggeration, when compared with the efforts of the crusaders at 'Arqah, this larger group of machines must have been a strong statement both of intent and determination as well as of power. Thirdly, as with the machines at Arsuf, there is no indication at this point in the aftermath of the First Crusade that the Christians were making any attempt to employ artillery to attack the defences of the cities assaulted. Artillery was instead used in an entirely anti-personnel capacity. Fourthly, this is another incident, following from the siege of Arsuf where the use of artillery seems to have been primarily an auxiliary measure to support the attack being made by a siege-tower.

SIEGE OF CAESAREA (1101)[18]

The siege of Caesarea, led by Baldwin I, ended with the capture of that coastal city. The siege took place immediately after Baldwin had captured Arsuf with the aid of a fleet from Geona.[19] Caesarea was unable to hold out for long against the pressure from the attacking forces.

PREPARATION FOR THE SIEGE AND INITIAL ACTIONS

Fulcher of Chartres, p. 401:	Guibert of Nogent, p. 346:	William of Tyre, p. 470:
iussit ergo tunc rex[20] *petrarias* fieri et	His ita probe, ut decebat, explosis, e vestigio quo	obsidionem locant in circuitu et *machinis*

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[17] RC, p. 680; see also, 'Siege of 'Arqah: Crusader Equipment', pp. 174-180.

[18] S. Runciman, *A History of the Crusades*, II, pp. 73-4.

[19] *Ibid.*, p. 73.

[20] There is a difference at this point between Heinrich Hagenmeyer's edition and that of the *Patrologia Latina*. The *Patrologia Latina* included the word *tres* at this point, which is rendered as *rex* by Hagenmeyer. For the *Partologia Latina* version see FC, Patrologia, col. 835. Hagenmeyer notes the possible use of the word *tres* in this situation but distrusts it. His variant apparatus and footnotes trace the change to

machinam unam ligneam altissimam, de mal et remigibus navium fabrefactam.

numerosiorem potuit conflat exercitum et Cesaream Palestinorum eximiam non contuitu milium sed spe potius virium obsisione precingit. Acceleratur itaque fabrica machinarum, multiplex circum muros *balista* porrigitur, quod 'arietem' vocitant a fronte ferrata trabes inducitur. Comparata minibus castra phalarum, sed non una, procedunt et murorum propugnaculis assistentes non sulom variorum imbre missilium Sarracenos illapidant, sed etiam collatis mucronibus aliquando trucidant. Fervere ibi cerneres maximis *tormenta lapidibus* et non modo parietem muri vexare forasticum, verum procera acrium molibus ictuum civitatis irritare palatial. Pulsare quam sepius edes ac menia saxis omiserant et cum liquore plumbeo ferri candentis offulas, ut conflagretur oppidum amenta recussa dispergunt.

iaculatoriis congruis stationibus dispositis urbem impugnant animosius

Of these three versions of events at Caesarea, all make general statements that include reference to artillery being built or set up around the city. They all, however, use different terminology to describe these initial actions by the crusaders. The use of the term *petraria* by Fulcher of Chartres, of *balista* by Guibert de Nogent or of *machinae iaculatoriae* by William of Tyre are not, however, particularly informative. The information provided by Guibert, however, is

the edition of Duchesne (Historiae Francorum Scriptores, IV, pp. 816-89). Hagenmeyer does not identify *tres* as appearing in any of the manuscripts he examined while preparing his edition.

somewhat problematic. First of all the word order is not particularly clear: it seems that it is the word *balista* that is referred to by the phrase *quod 'arietem' vocitant*, perhaps indicating a nickname that was applied to the missile weapons. It is more logical, however, to ignore the specifics of the word order and use logic to recognise that it must be the *trabes* ('tree-trunk', 'beam' or 'mast') that was being referred to as an *arietem* ('battering-ram'). Furthermore, Guibert's use of the term *multiplex* is interesting. It is an adjective to the word *balista* here. The most obvious meaning of the word in this instance is to indicate that there were many *balistae* present. Given that these weapons are described being spread out around the walls of the city, it would be a significant grammatical error on Guibert's part to put the term *balista* in the singular when there must have been many of them if they were spread out. The term *multiplex* also has other meanings, however, and perhaps Guibert used it in an effort to indicate something else about the *balista* as well as its plurality. Perhaps the most pertinent alternative meaning of the word is 'having many twists/turns', which may be a signal that there was some form of twisted rope – a component of classical *balistae* – involved in the machinery. It is, however, impossible to prove that Guibert intended to use the term in such a dual manner but when one considers that *multiplex* is not a word that features regularly in Guibert's work to indicate plurality, even though it must be a plural word here, it is possible, though ambigious, that Guibert was also trying to indicate the complex nature of the machines in question with the use of that particular term. Overall this one sentence in Guibert's narrative is packed with information interesting to the military historian but the unpacking of that information is decidedly awkward given the structure of the sentence and the strange wording.

Despite the confusion over some parts of Guibert's narrative here, the artillery specific terminology employed by both him and Fulcher fits in well with their overall terminology and, to some extent, runs the risk of having been little more than a default term for the author in question. *Machinae iaculatoriae*, the term utilised by William of Tyre, on the other hand, is clearly a very general and generic term that says little about the nature of the machines in question. It is clear, however, that the artillery of this siege played a more central role in the approach of

the crusaders than was common in other sieges where artillery was very much reserved to an auxiliary role.

The most telling element of the descriptions provided here comes late in Guibert of Nogent's detailed descriptions of the events at the start of the siege, where he states:

> Fervere ibi cerneres maximis *tormenta lapidibus* et non modo parietem muri vexare forasticum, verum procera acrium molibus ictuum civitatis irritare palatial.

This gives the first occasion in the series of sieges following the successful prosecution of the First Crusade that the Christians are described using artillery to attack the physical structures involved in the defence of a city. At both the sieges of Arsuf and Haifa, discussed above, artillery use was limited to anti-personnel actions against the defenders of the cities. The manner in which artillery is depicted in this instance is a departure from that trend of anti-personnel use. There is, however, no indication that the artillery used by the Crusaders at this time had the ability to create a breach in the walls of a city even if they did have the potential to destroy buildings inside the walls.

FINAL ASSAULT ON THE CITY

Fulcher of Chartres, p. 402:

sed cum per XV dies obsidionem tenuissent et cum *petrarias* arces muri superiores aliquantisper laesissent, necdum turris lignea esset penitus compacta, moram eis fastidientibus, noluit diutius Francorum probitas prolongare, quin absque machina praedicta et ceteris supplementis die quadam Veneris civitatem ausu mirifico cum scutis et lanceis appeterent.

Albert of Aachen, p. 567:

… Nona tandem hora diei facta, grauati cuies crebris et numquam intermissis assultibus, tam *mangenellis* quam sagittarum grandine fessi et uicti, per uicos et diuersa loca ciuitatis tremebundi fugerunt.

There is a discrepancy between the descriptions of the fall of Caesarea in the accounts of Fulcher of Chartres and Albert of Aachen. Fulcher relates a very straightforward capture of the city following an assault whereas Albert of Aachen,

in a much more detailed account, wrote of a more protracted fall during which the outer parts of the city were captured first. The attackers held these areas for nine hours and spent all that time assaulting the second line of defence, which eventually surrendered.

The use of *petrariae* as detailed in Fulcher of Chartres's work backs up the statement made by Guibert of Nogent in the previous case study that artillery was used to assault the walls of the city at Caesarea. Fulcher's account reveals that over the course of fifteen days the upper parts of the walls (*muri superiores*) were damaged by the *petrariae*. There are a few points to be noted from this. It took a significant investment of time, fifteen days, to cause any damage to the walls. Only the upper parts of the walls, where defensive walls would have been at their thinnest in contrast to the battered base of the defences, were damaged. No breach was created in the walls as a result of these artillery actions. In the end, according to Fulcher, it was a *turris lignea* that brought about the fall of the city rather than the effect of the artillery pieces.

The *mangenelle* that appear in Albert of Aachen's work do so at a different juncture, when the crusaders were attacking the second line of defence. In this instance, Albert wrote that it was the actions of the *mangenelle*, combined with the use of arrows, that brought about the final surrender of the defenders of Caesarea. These weapons, which were on a smaller scale to *mangene*, though apparently with a similar typology, were used in a manner that suggests they were easily manoeuvrable. They were brought into the city and used to assault inner walls.

From the various elements of the artillery use evident in this case study, it is manifest that artillery played a larger role in this siege than had been the case in the preceeding sieges of Arsuf and Haifa. That is not to say, however, that artillery was the single decisive factor in bringing about the fall of the city: in Fulcher's account that honour fell to the siege-tower and the men who assaulted the walls from it whereas in Albert's the initial assault that broke through the walls was crucial in bringing about the case of affairs that allowed the *mangenelle* and arrows to deal the final blows to the defenders.

SIEGE OF JAFFA (1102)[21]

The failed 1102 siege of Jaffa by a Fatimid force led by Meraius, a vizier, is accorded only brief discussion in the sources. The Fatimid army managed to maintain their siege when Baldwin I arrived and battled his way into the beleaguered city but were pushed into retreat when further reinforcements arrived and their forces were defeated in battle.

Fulcher of Chartres, p. 451:	Albert of Aachen, p. 646:	William of Tyre, pp. 480-1:
illi equidem non longe ab ioppe erant, sed quasi tribus miliariis, ubi *machinas* suas iam praeparabanat, ut indique Ioppem obsiderent et coartatam comprehenderent	Meraius et cuncti potentes Babylonie in uirtute magna et manu robusta ad ciuitatem Iafeth profecti sunt, ac plurimo instrumento et *tormentis lapidum* ac bellico impetus uiros in ea repertos uexauerunt.	Erant autem hostes in proximo quasi ad miliaria tria, crates, scalas et varii generis *machinas* ex electa lignorum material contexentes

Only one of the major sources, Albert of Aachen's *Historia Iherosolomitana*, directly refers to the presence of artillery at the siege of Jaffa. Both Fulcher of Chartres and William of Tyre, probably using Fulcher as a source for this part of his work, mention the appearance of *machinae* at the siege. This general, umbrella term could well have included artillery; indeed this was probably the case, considering that Albert of Aachen stated that *tormenta* were present at the siege, but it does not provide any information on the type of artillery that was present. Thus Albert's testimony stands alone as a source on artillery in the accounts of this siege. These artillery pieces, operated by the Fatimid troops who were besieging the city, targeted the defenders of the city rather than the city itself. This siege of Jaffa was brought to an end by the arrival of the king, Baldwin I of Jerusalem, at the siege to aid the defenders. As a result, it is unknown how the siege would have progressed had the Fatimids been allowed the freedom to prosecute it further.

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[21] S. Runciman, *A History of the Crusades*, II, pp. 78-80.

SIEGE OF ACRE (1103)[22]

This is the first of two sieges of the important port of Acre in the successive years 1103 and 1104. This earlier siege was a failure for the Christian forces attacking the city and was only pursued for a limited time; as a result, it was less written about than the successful siege of the following year.

Fulcher of Chartres, pp. 456-7:	Albert of Aachen, p. 660:	William of Tyre, p. 485:
Anno M°C°III°, tempore veris, cum Pascha ex more in Hierusalem celebrassemus, urbem Accon, Ptolemaidam dictam, rex cum exercitulo suo adresus obsedit. sed quia muro et antemurali fortis erat valde, non potuit eam tum comprehendere, praesertim cum mirabiliter Saraceni probissime intus se defenderent. cum autem tam segentes quam virgulta eorum hortosque devasset, Ioppem rediit.	exercitum congregans ad quinque milia uirorum ad menia prefate ciuitatis applicuit. Quam, undique posita obsidione curriculo quinque ebdomadarum sic *mangenarum* iactu et machinarum subimitate oppugnauit ut ultra uim et difficiles impetus iam in manu Regis impetrata uita reddere urbem cogerentur.	Ad Hanc igitur cum suis legionibus dominus rex perveniens, quoniam navalem non habebat exercitum non multum potuit quoad deditionem artare, sed cesis in circuitu pomeriis, interemptis ex civibus nonnullis abducta etiam preda gregibus et armatis, que extra civitatem reppererunt, soluta obsidione ad propria revertebatur.

Neither Fulcher of Chartres nor William of Tyre make any reference to the use of artillery. Albert of Aachen's account, on the other hand, does make one reference to the use of *mangene*. His account reveals little about the nature of the artillery in this period except that, if these machines were used against the city for five weeks as Albert states, there is a lack of power evident in the use of artillery at this siege. Fulcher's account of the siege of Caesarea, claimed that after fifteen days the *petrariae* of the attackers had damaged the upper parts of the city's walls.[23] There is a dichotomy in the effectiveness of the machines described in these two sieges, which were separated by only two years. There was, of course, any number of other differing factors in play at these two sieges, of which the most important

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[22] *Ibid.*, pp. 87-8.

[23] FC, p. 402; see also, 'Siege of Caesarea (1101): Final Assault on the City', pp. 245-246.

would have been the strength of the walls. It is feasible that the walls of Caesarea were simply weaker than those of Acre, a more important city. As a result, direct comparisons between the two sieges is difficult but the fact remains that in a longer period of time, five weeks as compared to fifteen days, there were fewer reported effects of artillery use at Acre than at Caesarea.

DEATH OF *REINOLDUS*

Albert of Aachen, p. 662:

> Eadem denique die Reinoldus pluruimum belli et cedis dum a machina aduersus hostes exerceret, incautus et intrepidus nimium in aperto assistens, subito *mangenelle* impetus lapis emissus illi in uerticem uenit, et sic mortuus

The death of a prominent member of the besieging army provides a reminder of the deadly impact artillery pieces sometimes had in the course of a medieval siege. Reinold died after by being struck in the head by a stone thrown from a *mangena*. There are similar examples of this sort of death in many other sieges in the crusades; the deaths of Pons of Balazun and Anselm of Ribemont at the siege of 'Arqah, for example, provide parallels.[24] Although the weapon recorded as responsible for the fatal blow was a *mangenelle*, which has been noted as a smaller version of a *mangena*, it is not surprising for this weapon to have been capable of such power.[25] A mention of the use of *mangenella* at Antioch to throw heads, likely to have weighed up to six kilograms, shows that these weapons did have the capacity to hurl weights that could cause serious damage to one's opponents.[26] This instance confirms that.

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[24] Pons of Balazun was reported in the works of Raymond d'Aguilers and Robert the Monk to have been killed at 'Arqah, Rd'A, pp. 200-1 and RM, p. 857. The death of Anselm is recorded by AA, p. 376. See also, 'Siege of 'Arqah: Crusader Equipment', pp. 174-180.

[25] See above, 'Albert of Aachen', pp. 59-65.

[26] W. T. Dempster & G. R. L. Gaughran, 'Properties of body segments based on size and weight', *Americal Journal of Anatomy*, 120 (1967), p. 52 - the exact weight range of a human head provided in this study is 5.119kg ± 0.838kg. AA, p. 210, also see above 'Siege of Antioch: Captured Christians' Heads Thrown from the City', pp. 142-143.

SIEGE OF ACRE (1104)[27]

Much like the failed siege of the previous year, the eventual capture of Acre occurred with little detail being provided in the sources. To some extent the sources treat of these two sieges as a single episode or story and, as a result, there is less concentration on individual events. The key difference between the two sieges and the difference that is credited with bringing about the success of the 1104 siege is the presence of a naval force alongside the land army. This allowed the besiegers to block off ingress and egress from the seaward side of the city, an important port. As a result, a much tighter blockade was laid around the city and led, in no small part, to the greater success enjoyed by the assailants in 1104.

Fulcher of Chartres, pp. 462-3:	**Albert of Aachen, p. 670**:	**William of Tyre, p. 487**:
Anno M°C°IV°, transacta hieme, cum in Hierusalem verno florente Paschae sollemnia celebrata fuissent, rex Balduinus congregata gente sua profectus est Accon et iterum obsedit eam. ad quod venerunt Ianuenses cum classe LXX navium rostratarum. et cum civitatem *machinis* et pervasionibus crebris per XX dies circumcira cohibuissent, perterriti valde Saraceni, vellent nollent, reddiderunt eam regi.	Rex autem in arido in circuitu murorum castrametatus est. Illic uero aliquot diebus *tormenta lapidum* et machinas fabricantes, dein urbem et cuies sine modo uiriliter et non parce assilientes, usquequaque oppugnabant donec Sarracenorum uires et manus ad resistendum fesse nil ultra ause sunt.	Sic igitur die prefixa illi per mare, dominus rex cum suis per terram urbem predcitam, locates in girum castris, obsidione vallant civibusque introitu negato et exitu molestias inferunt, quales quanteque solent obsessis irrogari. *Machinis* etiam circumpositis, quales solent argutorum hominum reperire ingenia in hostium erigunt perniciem, turres ex eis flagellantes et menia, et edificia etiam interiora magnorum molarium imissione confringentes.

The appearance of artillery in the accounts of the siege is limited to one brief reference in Albert of Aachen's work to the attackers building *tormenta lapidum*. That the attackers, led by King Baldwin I, constructed their machines on site is important in the context of the next major appearance of artillery in the

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[27] S. Runciman, *A History of the Crusades*, II, p. 88.

crusade narratives in the course of a planned expedition against Sidon in 1106.[28] The term *tormenta lapidum* in itself provides no new information in addition to that gleaned from earlier case studies on the nature of crusader artillery.

ABANDONED PLAN TO BESIEGE SIDON (1106)[29]

Following the arrival in the crusader principalities of a fleet from England in the summer of 1106 a decision was made to launch a campaign against Sidon combining the naval power of the English with the land power of the established crusaders. King Baldwin I of Jerusalem was to lead the expedition. In preparation, as can be seen in the extract below, he travelled to Acre to get ready all the equipment that would be necessary to conduct the siege. Due to the death of one of the crusader nobles, Hugh of Tiberias, while engaged in a raid aimed at garnering supplies for his contingent in the siege, a campaign against Sidon did not take place until 1107.[30] Despite the cancellation of the proposed siege, the story of its planning survives in the crusader record.

Albert of Aachen, p. 720:

> Rex Acras cum patriarcha et omni domo sua descendit, et machinas et plurima *tormentorum genera* per dies quadraginta fabricans et componens, ordinansque omnia ad unguem fieri que ad assultum urbis aptiora uidebantur

This incident is crucial in tracking the changing level of preparation for sieges in this period. There are numerous cases throughout crusader history up to this point in which the sources inform the reader that the crusaders built their siege machines at the site of the siege while blockading the city. This was to be expected from a migrant army lacking a logistical base in the region but in the following years it stands to reason that more established armies should have been better organised for their campaigns. Yet this story recounted by Albert of Aachen, did not occur until 1106, eight years after Bohemond's establishment in Antioch and seven

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[28] See next case study.

[29] S. Runciman, *A History of the Crusades*, II, p. 91.

[30] See below, 'Siege of Sidon (1107)', pp. 257-261.

years after the capture of Jerusalem. It is important to note that this is not necessarily the first occasion on which this kind of preparation occurred. All that can be stated with certainty is that it was the first time it is recorded in the crusade sources. The 1104 siege of Acre, however, provides a chronologically proximate event with which the logistical planning for the abandoned Sidon assault can be compared.[31] For the attack on Acre, a mere two years prior to the abandoned Sidon expedition, the crusaders were reported to have built their machines on site. Thus there is a case that this was indeed the first incident of the production of a siege train by the crusader principalities in preparation for a siege.

Another point to be taken from this incident is the form in which artillery is refered to: *plurima tormentorum genera*. This would seem to indicate that there were numerous types of artillery constructed at the siege. The profusion of many different terms for artillery across the sources could, in a sense, suggest that the crusaders employed several types of machines but the vagaries of the terminology make it difficult to base concrete conclusions on slight changes in terminology. In this case, however, there is a fairly clear indication that the crusaders were not limited to one type of artillery. It has been argued elsewhere that the crusaders were likely to have used both *balistae* and traction trebuchets at different times in the course of their siege warfare going back as far as the siege of Nicaea.[32] This incident contains another element that must be taken into account; the term *tormentum* is unlikely to have referred to a *balistae*. At no point in any of the crusader narratives is a *tormentum* mentioned in connection with hurling or shooting anything other than stones despite the term's appearance in several of the crusade narratives.[33] Given this consistent connection between *tormenta* and the

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[31] See above, 'Siege of Acre (1103)', pp. 248-249.

[32] For discussions of the possible use of *balistae* in the First Crusade see above, 'First Crusade Case Studies: Conclusions – Artillery Typology in the First Crusade', pp. 214-225. The evidence for the appearance of traction trebuchets in the course of the crusades is examined in a number of case studies: see above, 'Siege of Nicaea: The Aftermath of the Siege', pp. 131-133; 'Siege of Antioch: The Treatment of the Christians Within Antioch', pp. 148-152; 'Siege of Jerusalem: Messenger/Spy thrown toward city', pp. 185-189; also, see below, 'Siege of Lisbon: Organisation and Effect of the Artillery Crews', pp. 305-306.

[33] AA, pp. 110, 112, 422, 502, 516, 646, 670, 720, 756, 788, 804, 806, 820, 830, 852; RM, pp. 853, 857; GN, p. 341; Rd'A, pp. 173, 339, 342; FC, pp. 158, 662,

throwing of stones, the phrase *plurima tormentorum genera* can be taken to indicate that not only did the crusaders use two or more different types of artillery in the course of this siege but that there were two or more types of specifically stone-throwing artillery pieces at this siege. A likely candidate to fill the role of one of these types is the traction trebuchet, which has been identified with a strong degree of certainly as having been part of the crusader batteries at the 1099 siege of Jerusalem.[34] It is the identity of another type that is mysterious. There are types that could be suggested the classical *onager*, for example, or the counter-weight trebuchet, an unlikely answer this early in the twelfth century, but there is little evidence here or in the other case studies examined in this thesis to promote any one possibility over another. Moreover one cannot rule the possibility that Albert of Aachen was engaged in a piece of hyperbole. Although he was a fairly direct author, especially in comparison to the language and approach of more elaborate writers such as Guibert of Nogent, it is not beyond the realms of possibility that Albert exaggerated matters in this incident for dramatic effect.

SIEGE OF CASTLE ARNOLF (c. 1106)

The siege of Castle Arnolf, modern Yalu, west of Jerusalem, was undertaken by forces from Ascalon who succeeded in winning control of this crusader fortification. The dating of this event is uncertain but its position in the narrative of Albert of Aachen would seem to place it in 1106.

Albert of Aachen, p. 732:

> Illic biduo obsidionem facientes, et minas *mangenarum* ac machinarum promittentes, adeo uiros inhabitantes exterruerunt ut Gunfridus, custos ac prepositus arcis et turris Ierusalem, qui et huic Arnolfi persidio nunc preerat, uix uita impetrata dextras Sarracenorum quereret, se in deditionem redderet ac presidia ianuam hostibus aperiret.

764, 799; RC, pp. 679, 680, 691, 692; WT, pp. 206, 255, 373, 403, 404, 663, 667, 670, 719, 797, 827, 877, 927, 929, 930, 987, 1055.
[34] See above, 'Siege of Jerusalem: Messenger/Spy thrown toward city', pp. 185-189.

The story of the surrender of a fortress named Castle Arnolf in Albert's narrative is, understandably, brief. This was not a major city of the crusader states. Its fall, however, once more, highlights the potential of artillery pieces and other machines, *mangene ac machinae*, to strike fear into the hearts of those defending fortified places. Perhaps Gundred could be argued to have surrendered more quickly than was necessary. Albert states that he did so after only two days of siege, but, nonetheless, the statement about the fear factor that these weapons possessed is undiminished.

SIEGE OF APAMEA (1106)[35]

Apamea, a city near the Orontes river south of Antioch, was unsuccessfully besieged by Tancred on two occasions in quick succession. A number of months after his first unsuccessful attempt, Tancred's attempts to capture the city were aided by Musbih ibn Mula'ib, a son of the former ruler of the city.[36] It was in the course of describing this second siege of Apamea that Albert of Aachen referred to the use of artillery and, as a result, it is only that second siege that is analysed here.

Albert of Aachen, pp. 738-9:	**William of Tyre, p. 481**:
Tancradus, readunatis usquequaque sociis et uiribus, Femiam descendit, undique machinas et *mangenas* applicans, ut sic forte superata ciuitas in manu sua et non in manu Brodohan redderetur, ciues cum traditore punirentur.	Ubi cum aliquamdiu more optimi principis debita perseverasses instantia, singula percurrens argumenta quibus hostium solent expugnai presidia, nichil omittens eorum que obsessis molestias solent inferred graviores
Interea dum frustra assultibus et machinis circa hanc laboraret, et minime ciues absterreret, diesque plurimi iam preterirent...	
Nec mora assultus assidui et iactus lapidum sine intermissione a foris fiunt, sed frustra omnia uidentur fieri, dum tandem uallo tota circumfoditur ciuitas,	

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[35] S. Runciman, *A History of the Crusades*, II, pp. 52-3.
[36] *Ibid.*, p. 53.

ne cui deintus aliquo patente exitu, ciues
fame sic artati, et traditor qui in ea
habutabat, in manum et ditionem
Tancradi redderentur.

This is one of the sieges of this period over which there is a chronological
doubt. William of Tyre's history places before the 1103 siege of Acre but that is not
the case with the *Historiae* of Albert of Aachen. Albert's work places the siege in or
around the year 1106. Given that Albert's account was written with a closer
chronological proximity to the events described, his sequence of events has been
preferred in the ordering of the sieges being analysed here.

The description of artillery employed in the course of this siege is revealing;
Albert's work makes it clear that the attackers employed *iactus lapidum sine
intermissione* but, also, he is equally clear that that ceaseless attack met with no
success and that it was not until the city *uallo tota circumfoditur*, that the besiegers
found themselves in a dire and inescapable situation. That the artillery of the
crusaders was ineffectual is noteworthy. As William of Tyre is silent on the matter
of artillery and Fulcher of Chartres is silent on the siege as a whole, Albert's
description of the combination of military methods used stands alone. It is worth
pointing out that there is no indication of the strength of the defences or of the
length of time spent pursuing the siege of Apamea and, as a result, it is difficult to
pin point how much this incident informs the modern reader about the strength of
crusader artillery. That does not alter the fact that Albert's account makes it plain
that, despite their ceaseless application, the artillery employed by Tancred's forces
against Apamea was ineffective.

SIEGE OF DURAZZO (1107-8)[37]

This siege of Durazzo, a Byzantine city on the Adriatic coast in modern
Albania, was not a new departure for Bohemond of Taranto. He had been involved
in a siege of the city from June 1081 to February 1082 led by his father, Robert

[37] R. Rogers, *Latin Siege Warfare in the Twelfth Century*, pp. 103-5; S. Runciman,
A History of the Crusades, II, pp. 49-50.

Guiscard.[38] That siege, however, only secured control of the city for the Normans in 1083. Although the 1107-8 siege of Durazzo did not take place in the newly formed and expanding crusader states, it was conducted by a prominent member of the First Crusade, Bohemond, at that time prince of Antioch, who was returning to his crusader principality after visiting Europe to drum up support for the crusader cause. The Byzantine defenders of the city were also major players in the crusade movement. As a result, the siege has a number of similarities with the the military events of the crusades and, thus, references to artillery usage at this siege might be revealing when incorporated into this study of crusader artillery. This siege began soon after Bohemond landed on the east coast of the Adriatic in October 1107 and lasted until he was forced to retreat in the spring of 1108.[39]

Fulcher of Chartres, p. 520-1:	Albert of Aachen, p. 756:	William of Tyre, p. 504:
et Avalone citissime capta, Duratium urbem aduentes, III. Idus Octobris obsederun. sed quia civitas tam hominibus quam victualibus satis erat munita, obsessores diu fatigavit. habebat quidem domnus Boamundus V milia militum et LX milia peditum.	Obsidione itaque tempore ueris undique locata, Boemundus machinas et *tormenta lapidum* fieri construit quibus urbs obpugnaretur. Sic diebus multis menia et turres brebo iactu lapidum minuebat, ciuesque et omnes inhabitants uehementi assultu uxebat. Ciues uero econtra ollas ereas ignis aqua inextinguibilis fomite refertas machinas intorquebant, ac, diuersa genera incendiorem in omne opus machinarum illius iactantes, sagittis, fundibulis, in omni uirtute restibant.	... tandemque Durachium obsidens, Epiri Prime metropolim, regionem circumquaque incendiis et depoppulationibus tradens circumadiacentibus regionibus pro libero arbitrio utebatur.

This is another incident in which Albert of Aachen records the use of artillery about which Fulcher of Chartres was silent. William of Tyre follows

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[38] G. A. Loud, *The Age of Robert Guiscard, Southern Italy and the Norman Conquest* (Harlow, 2000), p. 218.

[39] R. Rogers, *Latin Siege Warfare in the Twelfth Century*, p. 103.

Fulcher in making no mention of artillery in his description of the siege. There are, therefore, no control accounts against which to compare Albert's references to the construction of *tormenta lapidum* at the outset of the siege. The return to the construction of machines on site, following the detailed preparation evident in plans to besiege Sidon in 1106, is not surprising.[40] This was a force on the move from Europe to the Middle East that had just crossed the Adriatic Sea and which was without a logistical base from which to operate.

Albert of Aachen recorded the defenders of Durazzo as throwing (*intorquebant*) Greek fire at the machines employed by their assailants. It is unclear what, if any, machines were used in the throwing of this incendiary device. The lack of any evidence on the matter makes analysis problematic and one cannot rule out the possibility that containers of the mixture of the ingredients of which Greek fire was composed were thrown by hand at approaching siege-towers.

SIEGE OF SIDON (1108)[41]

The 1108 siege of Sidon, on the coast between Tyre to the south and Beirut to the north, was led by Baldwin I but his forces were augmented by ships from Genoa, Venice, Amalfi and Pisa. Despite this level of aid the siege ended in failure. The attempts to capture the town – eventually successful in 1110 – were part of the attempts of the crusader kingdom to take control of the entire coastline of Outremer.

PREPARATIONS AT THE OUTSET OF THE SIEGE

Albert of Aachen, p. 760:

> ... *mangenellis* et machinis muro a terra in circuitu applicatis, malis uero nauium turritis belloque paratis uersus aquas in manu fortis electis, expugnans eam diebus multis, et in uirtute multa suorum sepius eam fortiter assiliens.

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[40] See above, 'Abandoned Plan to Besiege Sidon', pp. 251-253.
[41] S. Runciman, *A History of the Crusades*, II, pp. 91-2.

Alongside other sections detailing the measures undertaken by crusader forces at the outset of their siege endeavours, this part of Albert of Aachen's work verges on the formulaic. There is not a huge amount to differentiate the statement *mangenellis et machinis muro a terra in circuitu applicatis* from the description provided by Albert of Aachen at the siege of Apamea *undique machinas et mangenas applicans* or from the siege of castle Arnolf where *minas mangenarum ac machinarum promittentes.*[42] Similarly at Arsuf, *aptaurent machinas et instrumenta mangenarum.*[43] The obvious difference is that at those two other sieges *mangene* were used whereas here, in preparing for Sidon, the crusaders set up the smaller *mangenelle.* Those machines, although smaller, seem to have possessed a very similar typology to that of the larger *mangene.*[44] As a result, there is perhaps little that can be taken from these references apart from the possibility that the crusade war machine had a very clear process at the start of each siege that was re-enacted time and again.

ATTACK ON A MURAL TOWER

Albert of Aachen, p. 762:

> Interea rex quondam turrim ciuitatis Sagitte ampliori assultu et crebo iactu lapidum dum irrumpere conaretur, et iam fere hanc perforasset, consilio Arnolfi, clerici et cancellarii regis, animus repressus est, ne hanc ulterius iactus lapidum totiens quassatam attereret. Dicebat enim tam egregium opus minime duobus milibus bisantiorum posse reedificari, et hanc sine ruina et lapidum iactura post dies paucos in manu regis traditam reserari.

The hints of a new power in artillery are evident here. Albert's account claims that there was a chance that the tower being attacked by artillery in this incident would collapse. This would suggest that the artillery pieces of the besiegers had the strength to batter mural towers to the ground. It is unfortunate that there is no specific term applied to the machines used but one can be sure that it was

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[42] AA, pp. 732, 738; also see above, 'Siege of Apamea', pp. 254-255 and 'Siege of *Castellum Arnolfi*', pp. 253-254.

[43] AA, p. 486; also see above, 'Siege of Arsuf: Construction of Siege Engines', pp. 235-236.

[44] See above, 'Albert of Aachen', pp. 59-65.

artillery pieces that bestowed the blows of stones (*iactus lapidum*) as it is impossible that stones thrown by hand would bring about such a structurally perilous state of affairs. This incident is not alone in pointing to the power of crusader artillery to damage mural structures: at the 1101 siege of Caesarea it was stated that fifteen days' bombardment brought about damage to the upper parts of the walls of the town.[45] That reported damage is nothing compared to this, however, as there was no suggestion that the damage to the upper parts of the walls was leading to the creation of a breach in the walls. The potential damage here should be seen as far more impressive. There are a number of questions that must be posed about this incident. Was this hyperbole of Albert of Aachen's part? Do these hints at more effective artillery suggest that there was a new type of machine being employed in the early years of the twelfth century that was not put into action in the First Crusade or the sieges in the years immediately following that campaign?

There are two key moments in the course of the First Crusade where the Christian forces were reported to have engaged in sustained efforts to damage the mural defences of the cities they were investing. Firstly, there was a detailed account in the course of Albert's account of the siege of Nicaea of an artillery attack by Count Raymond of Saint Gilles on a mural tower:

> Alia post hec die dum creberrimi assultus plurimorum in uanum consumerentur, comes Reimundus turrim quandam *duobus tormentis lapidum que uulgo dicuntur mangene* fortiter quassatam obpugnauit, sed minui et dissolui uel lapis unus ab hoc antiquo opere et cemento uix solubili robistissimo tam cotidiano iactu non potuit, dum ad extremum plura adaucta sunt lapidum quassantium *instrumenta*, quibus tandem muri concussi rimas per loca protulerunt, et aliqui lapides pre cerberrima iactione cum cemento minui ac labi ceperunt.[46]

There is a distinct difference between the effects of artillery on mural towers at these two sieges. In the earlier case, Raymond's artillery battery initially comprised two *mangene* but, as they were having no effect, more artillery pieces were brought to bear on the tower and still there does not seem to have been any real danger of the tower collapsing. The second incident comes from Albert's account of the siege of Jerusalem where he wrote of the use of *saccis, stipula, foeno, uel palea impletis,*

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[45] See above, 'Siege of Caesarea (1101): Final Assault on the City', pp. 245-246.
[46] AA, pp. 112-4; see also, 'Siege of Nicaea: Count Raymond's Artillery Assault on a Mural Tower', pp. 124-125.

ac uimineis cratibus densistate quoque naualium funium by the city's defenders to absorb the impact of the crusader artillery.[47] The need for such items to dampen the effect of the artillery suggests an imminent threat from that artillery but that threat cannot be verified as no breach was created at that juncture. There is no point in the First Crusade that artillery is depicted in a more powerful manner than this. It is safe to conclude, therefore, that the artillery employed in the First Crusade did not have the capacity or was not present in sufficient numbers to cause a breach in the mural defences of the cities that were invested. Consequently, the events at Sidon must be seen as a departure.

Leaving aside for the moment the effectiveness of the artillery pieces, there is no evidence of there being any developments in artillery forms or technology in this period. None of the authors mentions new machinery. Given the lack of interest in artillery among the crusade narrators, however, this lack of commentary on developments in that particular branch of military science would not be surprising. At some point in the course of the twelfth century the counter-weight trebuchet was developed but the exact date of its appearance is a bone of contention.[48] The year 1108 would seem too early a date for its development and more evidence than a few incidents of possible artillery induced mural breaches to argue that such a machine developed in this era. There are numerous other factors at play in these situations including the strength of the masonry being attacked as well as the skill of the teams operating the artillery. Consequently, without strong evidence to suggest otherwise, it would be irresponsible to insist that the developments in the effectiveness of the crusader artillery batteries was attributable to the invention of a new form of artillery. It should also be noted that the term used by Albert of Aachen to describe

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[47] AA, p. 424, also see above 'Siege of Jerusalem: Artillery Involvement in Siege-tower attack', pp. 194-209.

[48] There are various sieges that have been nominated as the first at which there is evidence for the appearance of the counterweight trebuchet. These include Nicaea (1097; P. E. Chevedden, 'The Invention of the Counterweight Trebuchet', pp. 76-86), Lisbon (1147; J. Bradbury, *The Medieval Siege,* p. 260), Tortona (1155; D. Nicolle, *Medieval Siege Weapons, Western Europe*, p. 19); Zevgminon (1165; K. DeVries, *Medieval Military Technology* (Ontario, 1998), p. 138); Castelnuovo Bocca d'Adda (1199; K. Huuri, 'Zur Geschichte des mittelalterlichen Geschützwesens aus orientalischen Quellen', *Studia Orientalia* 9, 3 (Helsinki, 1941), p. 64 and Chevedden, 'The Invention of the Counterweight Trebuchet', p. 76).

the artillery built at the start of the siege was *mangena*.[49] This is in no manner a departure from the norms of artillery nomenclature in Albert's work and does not in any manner hint at a change in typology.

SIEGE OF 'ARQAH (1108)[50]

This assault on 'Arqah which brought the town under crusader control almost a decade after the establishment of the crusader principalities, was led by King Baldwin I. The town was first besieged by a crusader force during the First Crusade (from 14 February to 13 May 1099).[51] That siege provided arguably the biggest Christian failure of that campaign. At that time the crusaders besieged the town for two months during a fractious period in the course of the First Crusade. They abandoned the enterprise to push on toward Jerusalem. This later siege involved forces led by William Jordan, an illegitimate son of Raymond of Toulouse, who had been ruling the county of Tripoli since the death of Raymond in 1105. William Jordan was, at this time, involved in a dispute between a recent arrival in the east of Bertrand, the son of Count Raymond of Toulouse, over control of the county of Tripoli.[52]

Albert of Aachen, p. 774:

> Qui tribus septimanis plurimam inpugnationem machinis et *balistis* custodibus presidia inferens, nullum introitum aut exitum alicui patiebatur, donec presidium, quod natura munitum et humanis uiribus uinci non poterat, fame artaretur, et in eius deditione redderetur.

The siege of 'Arqah in 1108 provides the final appearance of *balistae* in Albert of Aachen's *Historia*. The incident sees those machines used in an anti-personnel manner in conjunction with *machinae* to restrict the actions of the defenders of 'Arqah. The sentence following Albert's statement that *machinae et*

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[49] See above, 'Siege of Sidon (1107): Preparations at the Outset of the Siege', pp. 257-258.

[50] S. Runciman, *A History of the Crusades*, II, p. 67.

[51] H. Hagenmeyer, *Chronologie*, pp. 216-7, 230-1; also see above, 'Siege of 'Arqah', pp. 174-182.

[52] On Bertrand of St Gilles see: J. Riley-Smith, *The First Crusaders*, pp. 9, 242, 247, 250.

balistae attacked the defenders of the town relates that neither ingress nor egress was possible to or from 'Arqah. It is unclear from his description whether this state of affairs was connected to the actions of the *machinae et balistae* or not but it is a possibility that the *balistae* (as well as the other, unspecified *machinae*) played a role in creating a blockade around the city. The description of the siege by Albert makes it clear that the attackers did not have the capacity to take the city by storm due to the level of protection provided to the defenders by nature. As such, the plan of blocking the city to force its surrender equates well to the lack of power evident in the 1099 siege of 'Arqah. The possibility of an increase in the power of crusader artillery has been discussed elsewhere due to accounts of artillery created breaches or, at least, serious damage being caused to masonry defences.[53] The importance of these accounts vis-à-vis artillery power has, however, been questioned on a number of points. It is unclear if the appearance of artillery-created breaches is a result of more powerful weaponry or of any number of other factors, including the possibility that the walls being attacked might have been of inferior quality to those that withstood artillery barrages at earlier sieges. The evidence provided by this siege of 'Arqah is of importance as it provides a direct comparison between the state of artillery power in 1108 and that of 1099. In this situation, at least, there is no noticeable improvement in the strength of artillery. The efforts of the crusaders were blunted as much in 1108 by the defences of 'Arqah as they were in 1099. The crucial difference between the failure of 1099 and the success of 1108 was the crusaders' ability and determination to maintain the siege until the town surrendered. This was not an option for the leaders of the First Crusade due to the pressures from the majority of the army who desired to continue the march to their ultimate goal, Jerusalem.

There is no mention here of the attacking force spending any time constructing engines for the siege. The brevity of the account must be considered in any analysis of the siege and it is possible that the *machinae et balistae* mentioned were constructed on site without Albert stating as much. This siege, however,

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[53] See above, 'Siege of Caesarea (1101): Final Assault on the City', pp. 245-246; above, 'Siege of Sidon (1107): Attack on a Mural Tower', pp. 258-261; below, 'Siege of Cerez: Artillery Breach', pp. 272-274; below, 'Siege of Ventula', pp. 274-275; below, 'Siege of Caesarea (1138)', pp. 296-297.

provides a possible continuation in the evidence of the improving logistical capabilities of the crusader states. This improving case of affairs is best exemplified by the planning for an abandoned siege of Sidon.[54] Albert's silence on the matter of siege engine construction cannot be taken as definite evidence of organised preparation, however, and only a tentative connection can be made between this siege and those developments in crusader logistics.

SIEGE OF TRIPOLI (1109)[55]

In Fulcher of Chartres's account of the period in which this siege occurred, there is a clear and strong concentration on a dispute between Bertrand and William Jordan. The disagreement had spread beyond the two men and caused discord between Tancred and King Baldwin I. The dispute which had centered on who had the right to the control of Tripoli when it was captured, was settled with the intercession of Baldwin and the partition of the county between William Jordan and Bertrand was agreed.[56] After the disputing parties had been reconciled, the as yet uncaptured Tripoli, the centre of the dispute, was besieged by a combined force involving all the major princes of the crusader principalities. As a result of the concentration on the dispute, although there is a significant section of his *Historia* dedicated to this siege and the events surrounding it, Fulcher shed very little light on the siege methods employed by the Christian force outside the walls of Tripoli. Accordingly, Albert of Aachen is, effectively, alone as a military source for the siege.

Fulcher of Chartres, p. 532:	Albert of Aachen, p. 782:
tunc civitas undique coartata est. laborant externi, vexantur interni. sed cum Saraceni valde coartarentur et nulla spes iam eis esset evadendi, sub fidei	Iam tres septimane huius obsidionis et expugnationibus ante regis aduentum transierant, cum nec machinis aut aliquibus *mangenarum* quassationibus

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[54] See above, 'Abandoned Plan to Besiege Sidon', pp. 251-253.

[55] It is worth noting that this siege is also mentioned and discussed by William of Tyre but his account is rather general and gives no worthwile information on the siege machines or methods of the attackers; WT, pp. 509-10. S. Runciman, *A History of the Crusades*, II, pp. 68-9, 92.

[56] C. Tyerman, *God's War*, pp. 196-7.

pactione iurata et a rege

aut terroribus urbs adeo concuti aut superari potuit ut porte Bertranno aperirentur, nisi regis Baldwinu presentia affuisset.

In Fulcher of Chartres's account of the period in which this siege occurred, there is a clear and strong concentration on a dispute between Bertrand and William Jordan. The as yet uncaptured Tripoli, the centre of the dispute, was the town under siege here by a force including Bertrand, Baldwin I and a Genoese fleet.

Albert of Aachen's account of the siege of Tripoli is important in the analysis of one of the major issues concerning artillery use in the early twelfth century. There is direct evidence available from the account perhaps suggesting that artillery was increasing in power and effectiveness in the first decade of the twelfth century. Albert makes a clear statement on the role of artillery in this siege:

> cum nec machinis aut aliquibus *mangenarum* quassationibus aut terroribus urbs adeo concuti aut superari potuit ut porte Bertranno aperirentur

Not only was the use of machines and *mangene* at this siege insufficient to allow for the town to be taken by force. It was also not strong enough to convince the citizens that they would be wise to surrender. In the end only the arrival of King Baldwin I was enough to bring about the surrender of Tripoli. Clearly, even if artillery power was burgeoning at this time, the sieges of 'Arqah and Tripoli show that it was far from being a ubiquitous unrelenting power that allowed all crusader siege endeavours in the early twelfth century to triumph through the use of artillery to breach defences. There is a possibility that the appearance of the king brought with it the possibility of more effective weapons of war and that was the reason why the defenders surrendered to the recently arrived monarch. As with so many elements of the analysis of artillery use in this period, however, this can only be noted as a possibility, as Albert of Aachen gives no clear reason why the defenders surrendered to the king but would not to Bertrand.

SIEGE OF BEIRUT (1110)[57]

The capture by Baldwin I of Beirut, which had been previously under Fatimid control, was an important step in the crusader aim of securing control of the entire coastline of the Holy Land. The blockade of the town was aided by ships from Genoa and Pisa.

Fulcher of Chartres, p. 534-6:	Albert of Aachen, p. 788-90:	William of Tyre, p. 516:
Anno M°C°X° dum mensis Februus adhuc imbribus hibernis terras cohiberet, profectus est rex Balduinus Berytum civitatem et obsedit eam. cui venit in auxilium Bertrandus, comes Tripolitanus, et consedit exercitus ad primum ab urbe lapidem. cumque per LXXV dies, ut opinor, civitatem undique coartassent et naves, quae ad subsidium eorum illuc confluxerant, naves nostrae intra portum conclusissent, turribus ligneis muro tunc admotis, Franci nostri ausu magno de illis super murum nudatis cum ensibus prosiluerunt. Descendentes itaque in citivatem, cum per portas etiam multi ingrederentur, fugientes hostes vehementer persequentes, denique peremptos superaverunt eorumque pecuniam totam diripuerunt.	Obsedit denique eam diebus multis, machinis ac *tormentis lapidum* turres et muros singulis diebus non parce assiliens et quatiens, nulla intermissione ciues ac defensores respirare sustinens, sed et uineas et sata uastans et succidens, urbem non modice perterrebat. … Nec modo rex alias intendit nisi ut *machine iactus lapidum* assultus quoque circa urbis menia fierent, quosque Sarracenorum interiori uirite edomita urbs reddita aperiretur, ciues gladio punirentur aut uicti caperentur. Tandem portis cum seris suis et muris grauiter quassatis, ammiraldus ciuitatis in insulam Cypram nomine…	Erat autem eidem civitati pinea silva vicinior, que multam et idoneam obsidentibus ad componendas scalas et quaslibet machinas habunde prestabat materiam. Ex hac igitur erigentes sibi turres ligneas et *machinas iaculatorias* components et que ad usus huiusmodi solent esse necessaria fabricantes argumenta, urbem continuis impugnana assultibus, ita ut nec hore spacio, interdiu vel de nocte obsessis requiem indulgerent: alternatim enim et per vices mutuas sibi succedentes adinvicem, labore intolerabili cives fatigabant. Cum autem pre menses duos continuos in cepto opere viriliter desudassent

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[57] There is some confusion over the date of this siege with Albert of Aachen's account pointing toward a December 1109 start of hostilities whereas Fulcher of Chartres' narrative would suggest a start date of February 1110. S. Runciman, *A History of the Crusades*, II, p. 92.

There is a significant discrepancy between the accounts of Albert of Aachen and Fulcher of Chartres regarding their descriptions of the fall of Beirut to Baldwin I. The version provided by Albert has the defenders of the town surrendering to Baldwin, whereas that of Fulcher asserts that the town was captured by storm. With such a marked disparity of information, it is obvious that both sources cannot be correct and, as a result, questions are raised about the military veracity of both works. Fulcher, being based in Jerusalem from the start of Baldwin I's reign as king, was certainly better placed to garner first hand knowledge of the siege especially when one considers his role as chaplain to Baldwin I, the leader of the forces besieging the town. Given Fulcher's proximity to the events described, as opposed to Albert's distant location in Lotharingia, Fulcher would seem the more likely to have been correct.

The artillery brought to bear on Beirut was, apparently, largely ineffective. There is no repeat here of the dramatic effects associated with artillery at Caesarea in 1101 and Sidon in 1107.[58] Fulcher makes it clear that this was a long siege with the attackers spending seventy-five days assaulting the town. Albert of Aachen states that the use of *tormenta lapidum* was daily and that it put the defenders of the town under tremendous pressure: *machinis ac tormentis lapidum turres et muros singulis diebus non parce assiliens et quatiens, nulla intermissione ciues ac defensores respirare sustinens*. The effect of the long and consistent action by the attackers seems to have been minimal, however. Unlike Albert, Fulcher does not mention the artillery. It is clear that the machines were deployed in a different fashion to that seen at some other sieges. They were not used in an entirely anti-personnel manner; rather, they shook the walls and towers of Beirut. Despite artillery action being directed against the walls for up to seventy-five days, no breach was created. It is noteworthy that Albert ascribes the flight of Beirut's emir to the terror caused by the effect of the artillery on the walls and gates of the town.

Consequently there is some conflicting evidence that emerges from the description provided by Albert of Aachen of this siege. Despite a lengthy siege, the

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[58] See above, 'Siege of Caesarea (1101): Final Assault on the City', pp. 245-246 and 'Siege of Sidon (1107): Attack on a Mural Tower', pp. 258-261.

artillery of the attackers did not create an opportunity for the assailants to capture the town by storming it. On the other hand, Albert contends that the artillery action caused the emir to flee and, perhaps most importantly, his *Historia* declares that Baldwin depended or relied upon the actions of the throwing machines in his assaults on the town. There is an indication here that, even if artillery did not directly bring about the fall of the town, Baldwin placed his trust in those machines as the focal point of his attack. This assertion is not backed up by Fulcher of Chartres who suggests that it was the siege-towers employed by Baldwin at the siege that brought about the capture of the town. As a result, given the likelihood that Fulcher was better informed than Albert, it would be sensible to look at Albert's assertions with a level of doubt as to their veracity about the exact sequence and nature of events at Beirut. William of Tyre's account was, for this period, reliant on those of both Fulcher and Albert for his information. His account incorporates military information from both Fulcher and Albert in mentioning not only Fulcher's *turres ligneas* but also Albert's *machinae iaculatoriae*. Fulcher undoubtedly had more access to those who would have been well informed about the siege and its progress but, that is not to say that Albert's statements should be written off entirely. The sense in Albert's work of artillery playing a more central role in affairs than was evident in the accounts of earlier sieges must have had some basis. Albert seems to be the crusade narrator with the most interest in military affairs and specifically artillery. It would stand to reason, therefore, that he may have made a conscious effort to stay abreast of developments in the field and, therefore, although one might doubt that artillery played a central role in this specific siege, it cannot be ruled out that elsewhere in this period a more artillery focused siege strategy was developing. This certainly fits with the mounting evidence that artillery was gaining in effectiveness in the opening years of the twelfth century.

Despite the possibility of a change in the nature of artillery discussed above, the terminology associated with artillery in this incident is unsurprising and contains no alterations to terminology visible earlier in the source. Albert of Aachen uses two general artillery terms in the course of his descriptions: *tormenta lapidum* and *machine iactus lapidum*. Neither of these terms is, however, particularly revealing about the nature of the machines used.

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SIEGE OF SIDON (1110)[59]

A Norwegian fleet was on hand in 1110 to play a role in the capture of Sidon, a town that had resisted previous attempts by Christian forces to capture it. This coastal town had been a Fatimid territory before forces led by Baldwin I besieged and took it. The town surrendered in December 1110.[60]

PREPARATIONS AT THE OUTSET OF THE SIEGE

Fulcher of Chartres, p. 548:	Albert of Aachen, p. 804:	William of Tyre, p. 518:
Cumque ad Sidonem ventum est, obsedit eam rex a terra, Norrenses vero a mari et factis machinis	Nec multa mora Baldwinus rex, Bertrannus, accitis copiis, in apparatus copioso castrametati sunt in obsidionem urbis Sagitte, machinas et *tormenta lapidum* constitutentes quibus urbs per singulos dies obpugnaretur	Hanc igitur noster exercitus ex utraque parte obsidione vallans, civibus magnam intulere formidinem.

The appearance of artillery in these descriptions is brief. Albert of Aachen lists *tormenta lapidum* alongside *machinae* as part of the crusader attempt to attack the town every day. There is no mention of whether these attacks were directed at the defences or defenders of the town. Fulcher of Chartres makes reference to *machinae* and, one assumes, this general term encompassed the artillery that Albert asserts were present. William of Tyre makes no reference to the use of siege engines at the start of the siege. It is worth noting that Fulcher described the *machinae* being built on site. There is no indication of much forward logistical planning by the crusaders here and no evidence of the presence of a sophisticated siege train.

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[59] S. Runciman, *A History of the Crusades*, II, pp. 92-3.
[60] FC, p. 548.

Albert of Aachen, p. 806:

> Sic locata obsidione, toto mense Septembre in assultu et crebris ruinis muros et turres urbis angustiantes, ciuibus econtra in armis et *tormento lapidum* abintus fortiter resistentibus, machinam multis disbus compositam muro applicantes, uiros in *arcu baleari* in ea posuerunt, qui altitudine soliorum machine eminentes desuper muros per urbem et turres et eius menia speculatentur, et sic per uicos et plateas gradients plaga intolerabili artatent

There are two important terms that appear in this quotation. Firstly, Albert of Aachen states that a *tormentum* was employed by the defenders against a crusader assault on the town, which utilised a siege-tower. The nature of the description unfortunately relates little more than that the artillery pieces employed in the defence of the town threw stones. Thus, an identification of classical *balistae* can be ruled out but other possible forms of artillery abounded with a traction trebuchet being the most likely type to have been used in this period.

The other important term in this section is *arcus Balearis*. This term has been identified as a possible contender for a descriptor of 'crossbows' in Albert's *Historia*.[61] In this case there is nothing to rule out such an identification. The weapons in question were employed from inside a siege-tower and thus are patently not artillery pieces, which could possibly have been operated from the top of a tower but would seem unwieldy inside. There is, however, no positive evidence to support the identification of *arcus Balearis* as a crossbow instead of another sort of bow.

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[61] See above, 'Albert of Aachen', pp. 67-69.

Fulcher of Chartres, p. 548:	Albert of Aachen, p. 806:	William of Tyre, p. 518-9:
et factis machinis, terruit valde internos hostes, ita ut quaererent a rege qui solidarii erant, quatinus eos sanos inde exire permitteret, et si ei placeret, agricolas ad excolendum terras causa utilitatis suae in urbe retineret.	Tandem, curriculo sex ebdomadarum transacto, Sydonii uidentes se nihil aduersus machinam preualere, et *tormentis lapidum* assidue urbem et euis portas concuti [the town surrendered]	[William precedes this section by recounting a story of the failure of an assassination attempt on King Baldwin I] Videntes igitur cives commenta sua felices non habere successus, alia via ceperunt ingredi et missa legatione petunt ut nobilibus concedatur exitus, plebi vero, sicuti et prius, agriculture operam dare liceat bonis conditionibus. Quo concesso urbem resignant, cum uxoribus et liberis ad loca desiderata sine contradictore tendentes... Capta est autem predicta civitas anno ab incarnatione domini millesimo centesimo undecimo, mense Decembri, nona decima die mensis.

Albert of Aachen's account, as is so often the case, provides the most revealing details on the nature of artillery usage. It is clear from his account that despite having artillery pieces to oppose the siege-tower ustilised by the attackers, they were unable to prevent the progress of the tower. That the stone throwers inside the city were incapable of causing sufficient damage to the wooden tower is revealing both about the strength of the defenders's artillery pieces as well as about the carpentry skills of the attackers. There is, however, no indication of whether the defenders were using a different type of artillery from those the crusaders were accustomed to employ. Fulcher of Chartres's account of the fall of the city omits reference to artillery but does confirm the construction of, and the key role played by a *machina*, likely to the be the same siege-tower described by Albert.

William of Tyre's account of the capture of Sidon avoids reference to military matters in describing the fall of the town. The reason given by William for the town's surrender is the failure of assassination attempts on King Baldwin I. This reasoning ignores the defensive measures available to the citizens that were described by both Albert and Fulcher. There is no reason to accept William's esoteric explanation for the fall of the town ahead of the accounts provided by authors alive at the time of the siege with access to more first-hand information.

SIEGE OF CEREZ (c. 1109-1111)

The siege and capture of Cerez was led by Tancred of Antioch. Edgington has identified some confusion in Albert's chronology and geography here, however. Albert seems to conflate to cities (Cerez or Sarepta and Cerep). The chronology issue is brought about by Ibn al-Qalanisi's assertion that Tancred captured Cerep in Jumada AH 503 (late December 1109 to January 1110) but this is identified as a mistake by his editor who claims the date given is a year too early.[62]

CONSTRUCTION OF EQUIPMENT BY TANCRED'S FORCES

Albert of Aachen, p. 820:

> Tancradus, uidens presidium firmissimum et defensone Turcorum tutissimim, plurimus diebus machinas et *tormenta lapidum* fieri constituit, quibus undique in duodecim partes suos circa presidium constituens, nocte ac die turres et muros commitutissimo, quod et uigili custodia muniuit.

The construction of *tormenta lapidum* at Cerez is important, given the impact artillery had on the course of this siege.[63] The nature of the description provided by Albert of Aachen shows that this was a well-orchestrated assault on the town. Tancred's forces were well organised. They seem to have had a strong sense of what was necessary to blockade fully the town from all sides and, to achieve this,

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[62] AA, p. 820, n. 87 for details. Given this confusion, the city name used by Albert, 'Cerez', has been maintained here.

[63] See below, 'Siege of Ventula', pp. 274-275.

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spread out their siege engines so that they faced the town from twelve different positions. Apart from indicating that the artillery pieces threw stones, the term *tormenta lapidum* tells little about the nature of the throwing machines constructed. The manner in which they are described as having been spread out *in duodecim partes* ('twelve positions') around the town suggests that there were numerous artillery pieces at work during this siege.

Tancred's forces apparently lacked either the logistical capability or the foresight to prepare their siege engines in advance of the siege. Albert's account is unambiguous that they constructed their *machinas et tormenta lapidum* on site. The nature of the *machinae* built here is, however, unclear.

ARTILLERY BREACH

Albert of Aachen, p. 821:

> Sic Tancradus, ingeniis suis muro et turribus applicatis, et in tutamine ualli suis constitutis, diebus multis ruinam presido intulit, dum quodam die dominico post natale Domini magistra arx crebo iactu lapidum quassata corruit, et ab alto cadens turres duas que illi errant collaterals casu suo et pondere intolerabili comminuit, et sic Tancrado suisque sequacibus adytum patefecit.

The events at Cerez provide some vital information about the capabilities of artillery in the second decade of the twelfth century. The fact that *crebo iactu lapidum* brought about the collapse or toppling (*corruit*) of the *arx* of the town, which in turn, according to Albert, knocked down two towers, is crucial. This is a significant achievement for the artillery employed by Tancred and is one in a sequence of events spread out over the early decades of the twelfth century in which crusader artillery batteries displayed an ability to damage and, on occasion, even break down masonry defences.

The artillery available to the attacking forces was earlier said by Albert to be *tormenta lapidum*. The previous section analysed Albert of Aachen's description of the construction of these machines and noted that there would seem to have been a relatively large number of machines employed in the course of the siege. Previous

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sieges for which there are numbers provided by the primary sources include the siege of 'Arqah (1099), where Ralph of Caen said that three artillery pieces were used and Haifa (1100), where Albert of Aachen said that seven artillery pieces were used.[64] Siege actions for which medieval writers record a specific number of machines used are rare and, as a result, there are few examples against which to compare this siege of Cerez. In this case, there is no exact number provided for the amount of artillery pieces used but Albert does state that the *machinas et tormenta lapidum* were spread out at twelve places around the walls. Although it is not clear whether each of these twelve positions had one artillery piece or more or less, it can be deduced from the account that between the *machinae* and the *tormenta lapidum* there were at least twelve siege engines present at Cerez and there is a significant chance, given the strong organisation evident in the siege that there were twelve or more artillery pieces. If this were the case, it would be the largest number connected with a collection of crusader artillery pieces since the beginning of those wars in the East. Tancred's next use of artillery came at Ventula, a siege for which it is not reported whether he built machines on site or brought them with him.[65] At that siege, there would appear to be an interesting number of artillery pieces employed, namely twelve.[66] Taking into account the unknown providence of those later machines, it might be postulated that they were the very same as those used by Tancred at Cerez. This would fit well with the known number of positions set up around the walls of Cerez but it cannot be proven.

Although the exact and definitive number of artillery pieces at Cerez remains out of reach, one can safely make a case to suggest that this was a sizeable battery for the period and was likely to have included something approaching twelve *tormenta lapidum*. As a result, it is, perhaps, not suprising that this siege provided the first account of a clear breach being created in the walls by a crusade battery. The chance that this was an abnormally large collection of machines would suggest that the reason why the artillery had a distinctly more impressive effect was

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[64] RC, p. 680; also see above, 'Siege of 'Arqah: Crusader Equipment', pp. 174-180; AA, p. 516; also see above, 'Siege of Haifa: Siege-Tower and Artillery Assault on the City', pp. 241-242.
[65] See below, 'Siege of Ventula', pp. 274-275.
[66] AA, p. 824.

due to the enlarged number of machines used rather than any development in that machinery or in their strategic use.

SIEGE OF VENTULA (1111)

The siege of Ventula, conducted by Tancred with the aid of Turkish forces, followed on from Tancred's capture of Cerez earlier in the same year, 1111. Albert of Aachen reports that the siege began after Lent, which ended on 31 March that year, and lasted for three months. The siege came to an end when the defenders, demoralised by the efforts of Tancred's forces, abandoned the castle.

Albert of Aachen, p. 824:

> Tancradus, semper inperterritus, obsidionem magis firmans, *mangenas duodecim* ad urbis menia applicuit, donec barbicanas et turres, spacio unius mensis quassatas, usque ad interiora perforauit

Following close on his success at Cerez, at Ventula Tancred again showed the capabilities of his artillery pieces. The machines are identified as *mangene* and Albert is clear that there were twelve such machines. There is no indication that the crusaders used a mixture of artillery types in the course of the siege. The effect of these machines was crucial in Tancred's victory at Ventula. It is to the breach of the walls and the incessant barrage of stones that Albert ascribes the reason for the defenders fleeing their town.

It has been postulated above that Tancred's twelve machines may have been the same machines he used with equal success at Cerez. This is based on the coincidence of numbers between the two events – at both sieges there are likely to have been twelve artillery pieces – on the parallel effects of the weaponry at both sieges, on the chronological proximity of the sieges as well as on the lack of a description of machines being constructed at the later siege of Ventula. On the other hand, there is a counter argument to be made based on the usage of different artillery terms in both sieges. At the earlier siege, Cerez, Albert of Aachen referred to *tormenta lapidum*, whereas at Ventula the term utilised is *mangene*. A difference in terminology does not necessarily indicate a difference in typology and there are

several examples in Albert's work in which it is evident that he used the terms *tormentum* and *mangena* to refer to the same piece of artillery.[67] There is no positive evidence to show that Tancred transported machines from one siege to another but there is precedent for the crusaders building machines before a planned siege so as to save time on site.[68] There is, therefore, a possibility that Tancred was organised enough and had sufficient logistical wherewithal to transport artillery from one siege to another.

There is less ambiguity about the circumstances surrounding Tancred's success here than there is about his corresponding artillery triumph at Cerez. Albert of Aachen provides clear information here about the number of machines involved, twelve, as well as about the length of time spent bombarding the fortifications, one month. A much clearer idea, therefore, is given of the strength of crusader artillery. There is still one crucial unknown, however: there is no indication of the strength of the walls of the town. It cannot be ruled out that the breach in the walls was created by a fault in the defences.

As at Cerez, the most likely reason for the crusader success in this incident, however, is the size of the battery of machines used; but in the case of Ventula, the time pursuing the siege spent is also a factor. As a result and in the absence of further evidence, the combination of the large number of machines with the expenditure of a month bombarding the walls is what the artillery success at Ventula should be ascribed to.

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[67] For example, this phenomenon is evident in Albert of Aachen's description of the siege of Haifa where he referred to *tormentis lapidum septem que uocant mangenas*, AA, p. 516; also see above, 'Siege of Haifa: Siege-Tower and Artillery Assault on the City', pp. 241-242.

[68] Such a plan was in place for proposals to besiege Sidon in 1106, see above 'Abandoned Plan to besiege Sidon', pp. 251-253.

SIEGE OF TYRE (1111-12)[69]

This lengthy siege of Tyre proved unsuccessful for the crusade force that pursued it. The effort was led by King Baldwin I whose forces invested the town on 29 November 1111, according to Albert of Aachen.[70] The siege was ended when forces from Damascus came to the aid of the defenders of Tyre and Baldwin retreated with his forces in early April 1112.[71]

Fulcher of Chartres, pp. 559-60:	Albert of Aachen, p. 828-32:	William of Tyre, pp. 521-2:
nam cum duas turres, quas artificiose lignras muro altiores fieri iusserat, prope murum iam impegisset, unde civitatem comprehendere se putabat, sentientes Saraceni se morti proximos, nisi artem arte fallerent, ingenium ingenio opposuerunt, probitate fefellerunt. cum enim altitudinem turrium nostram se superare penitus circumspicerent, festini egentes auxilii nocturna operatione duas turres murales in sublime adeo extulerunt, ut de supernis propugnaculis earum probissime se defenderent et in turres nostras inferiors focum accenderent et	... agressus ui urbem, turres et menia omni genere bellico obpugnauit, de die in crebris assultibus iterates. ... Dein post dies aliquot, uidens rex assultu et *lapidum tormento* ciuibus et muris prorsus non nocere, duas fieri constituit machinas muros plurima altitudine supereminentes, ac componi ordine duorum cenaculorum ... Tyrii itaque econtra *tormenta lapidum* aptabant ad quassandas machinas et eas inhabitants, sed machine	Quibus obsessus urbibus solent irrogari molestie, omnia diligenter impendebat ut civitas in suam transiret dicionem. Nam crebris assultibus, contunuis pene congressionibus, murorum et turrim flagellatione et violentis ictibus, telorum quoque ac sagittarum immissione perpetua affligebat obsessis tandemque ad malorum cumulum duas percepit erigi ex lignea material turres, lapideis edificiis multo sublimiores, unde et urbem esset quasi subiectam inspicere et bellum civibus quasi de superioribus inevitabiliter inferre.

[69] P. E. Chevedden, 'The Invention of the Counterweight Trebuchet', p. 92; R. Rogers, *Latin Siege Warfare in the Twelfth Century*, pp. 79-82; S. Runciman, *A History of the Crusades*, II, pp. 93-4.

[70] AA, p. 828 and n. 6 – this date, provided by Albert is backed up by Ibn al-Qalanisi: Ibn Al-Qulānisī, *The Damascus Chronicle of the Crusades, extracted and translated from the chronicle of Ibn Al-Qulānisī*, H.A.R. Gibb, ed., (new edition, Dover, 2002) p. 120.

[71] Albert of Aachen has the king passing through Acre, to the south of Tyre, on 7 April 1112 – AA, p. 834 and n. 12.

concremarent.	coriis taurinis, camelinis, equines, cratibusque uimineir uestite, ictus lapidum palosque ferreos et ignites, illese et inmobiles sustinebant

The siege of Tyre in 1111-12 presents some interesting developments in the use of artillery by crusader forces in the twelfth century. All three of the major authors for the period cover the siege in some manner though not all of those accounts offer the same quality of artillery information.

Fulcher of Chartres' account pays no attention to the use of artillery in his description of the siege although he does corroborate the assertions in the other sources about the presence and use of siege-towers. William of Tyre is slightly more effusive on the issue of artillery, saying that besiegers *murorum et turrim flagellatione et violentis ictibus*. There is an indication here that the walls were struck by the machinery of the crusaders but there is no direct evidence to suggest what exact machines were used for the purpose. William's account of the siege, though replete with discussion of siege engines, makes no explicit reference to artillery and, as a result, for the purposes of this thesis there are few conclusions that can be drawn from his account of the siege.

Albert of Aachen's description of the events at the siege of Tyre suggests that artillery was one of the first assault methods used in the course of the siege but that it failed to bring about the desired result for King Baldwin I's attacking force and, as a result, the king ordered siege-towers to be constructed as the next attacking option. There is an inconsistency between this approach and that evident in some earlier sieges in which artillery was depicted as having played a secondary role.[72] This change in attitudes to artillery may have any number of causes. The successes enjoyed from aggressive artillery actions at Cerez and Ventula, as well as to a lesser extent, at the sieges of Caesarea and Sidon, show that either the artillery pieces themselves, or more likely the use and application of them was gaining in

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[72] See above, 'Siege of Nicaea: Count Raymond's Artillery Assault on a Mural Tower', pp. 124-125 and 'Siege of Antioch: Battle at *Waiferii* Gate', pp. 138-142 and 'Siege of Jerusalem: Artillery Involvement in Siege-tower attack', pp. 194-209.

effectiveness in the early years of the twelfth century.[73] The concurrent development in the logistical capabilities of the crusaders must also be considered as a reason for this change in attitude; the ability to transport machinery to a siege and not have to build engines from scratch on site may have been more suitable for artillery pieces than it was for more unwieldy siege-towers that may have had to be built to a customised standard for each set of walls with their esoteric heights. It is, therefore, possible that the initial use of artillery pieces was that they were more readily available for use than the siege-towers that were later turned to. Other possible explanations for this change are the personal preference of the commander or the individual needs of a particular siege. With all these possible reasons to be taken into account and given the lack of definite evidence on the topic, it would be irresponsible to posit one specific reason over the others but the evidence points to an appreciable increase in the importance of artillery to the crusaders during the course of the period 1096 to the end of the first decade of the twelfth century.

Albert's account also makes reference to the use of artillery by the town's defenders, stating that, to counter the newly constructed siege-towers, they utilised *tormenta lapidum*. This is a curious example of artillery use that has consequences for a significant term in Albert's *Historia*. The use of *tormenta lapidum* here is, at first, conventional. The defenders employed artillery pieces in a failed attempt to fend off the approaching siege-towers; the action of the artillery was foiled by the presence of *coriis taurinis, camelinis, equines, cratibusque uimineir uestite* in the structure of the towers. It is in the ending phrases of the description of the artillery action that the account deviates from the norm, however, when the missiles fired by the *tormenta lapidum* are described as *lapidum palosque ferreos et ignites*. This indicates that not only were machines throwing stones but also *palos ferreos et ignites* – 'stakes of iron and of fire', perhaps translated more succinctly as 'red-hot iron stakes', as it is found rendered by Edgington in her edition of Albert of Aachen's *Historia*.[74] The possibility that these machines fired stakes of iron, wood or any substance seems to be at odds with their description as *tormenta lapidum*,

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[73] FC, p. 402; also see above, 'Siege of Caesarea (1101): Final Assault on the City', pp. 245-246. AA, p. 762; also see above, 'Siege of Sidon (1107): Attack on a Mural Tower', pp. 258-261.
[74] AA, p. 833.

which would appear to indicate that they specifically threw stones. The term *tormentum* is not one that conveys the sense of a particular or specific type of artillery but its combination with *lapis* does seem, at least on the face of the matter, to narrow down the possible types of artillery that could be referenced by the term to those that throw stones. It is possible that the reference was to a machine that was capable of propelling either stones or bolts or it is also possible that this is a case in which Albert was less than accurate with his description of the machinery involved in the event described. There is little to inform directly on the exact nature of this event especially as there is no other account that goes into detail on the artillery used at this siege of Tyre but the possibility that Albert of Aachen's account omitted mention of some of the types of machinery that were present or, worse, that his account was inaccurate, is something that cannot be ignored, given his importance to the study of artillery in this period.

SIEGE OF JAFFA (1115)[75]

The siege of Jaffa was carried out by Fatimid forces based in Ascalon, a centre of Fatimid power that remained a thorn in the side of the kingdom of Jerusalem until it was eventually captured in 1153. Jaffa was the closest port to Jerusalem and, consequently, was strategically very important for the crusader kingdom, which was very reliant on maritime aid and trade. The attempt to capture the city ended in failure for the Fatimids.

Fulcher of Chartres, p. 585-6:

Dum autem haec ita agerentur, scientes Ascalonitae terram Hierosolymitanam militibus vacuam, accurrerut usque Ioppem, civitatem nostram, et opposuerunt ei obsidionem tam per mare quam per terram. adfuit enim idi Babilonica calssis LXX ferme navium, quarum aliae triemes, aliae vero rostrate, aliae negotiationis annona onustae. hi a

William of Tyre, pp. 531-2:

...resistant viriliter turresque ac menia pro viribus communientes, arcubus et *balistis*, iactu quoque pugillarium lapidum hostes a se propellunt longuis nec ad murum patiuntur accedere. Contigit autem Ascalonitis longe secus a spe quam conceperant. Nam urbem arbitrantes vacuam reperire, scalas fabricaverant et altitudine et numero

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[75] S. Runciman, *A History of the Crusades*, II, p. 99.

parte maris egressi et alii a terra parati adsilierunt urbem. et cum per scalas, quas secum attulerant, muram ascendere pertemptarent, a civibus, licet paucis et infirmitate deilibus, viriliter repulsi sunt. sed cum viderent se non posse quicquam proficere, sicut rati sunt, praeter portas urbis, quas igni combusserunt, timentes, ne forte Hierosolymitani Ioppitis auxilium ferrent, quibus iam hoc nuntiatum fuerat, reversi sunt Ascalonem qui per terram venerant, qui vero per marem, Tyrum navigaverunt. post dies autem X regressi sunt Ascalonitae Ioppem, arbitrantes providi improvidos adsultu repentino confundere. sed Deus onmipotens, qui eos primo, similiter secundo protexit et conservavit. in defendendo etiam se aliquantos ex illis occiderunt et de equis eorum retinuerunt. cum *fundibulis* coeperunt urbem cohibere, et cum scalis, ut prius, temptaverunt introire, quas in naviculis secum detulerant. sed cum per IV horas diei se fatigassent, maesti nimis cum mortis suis abierunt.

sufficientes, per quas statim sine contradictore infra menia irrumpere posse non diffidebant. Resistentibus ergo viriliter obsessis non dabatur eis scalas minibus applicare, quibus vix licitum erat ad eos, qui in turribus erant, aliquid iaculari)... Erant autem porte civitatis lignee, nullum ex ere vel ferro habentes operimentum. Has, ignem contorquendo, ex parte combusserunt, non tamen eatenus ut per eas maior vis civibus aut maior posset inferri molertia.

With the disappearance of Albert of Aachen as a source for siege warfare following the siege of Tyre, the frequency of references to artillery decreases, as Fulcher of Chartres becomes the main account for such matters. Fulcher's account for this siege does not concentrate on any one element of siege warfare and only makes the briefest of references to artillery. He described the use of *fundibula* by the attackers to *cohibere* or 'restrain' the city but it is to ladders that they turned in their attempts to gain entry. The depiction of artillery here is such that the sense is conveyed of a return to a secondary role in the hierarchy of methods used to capture a city. It is possible that the return to a portrayal of artillery common in the earlier years of the period under investigation is due to the removal of Albert as a source for this period. Fulcher never exhibited the same level of interest in artillery as Albert did and, as a result, plays a much smaller role in the identification of the development of artillery in the early years of the twelfth century. It could also be the case that the situation at Jaffa did not warrant the use of artillery to the same extent as other cities or that the attackers did not have sufficiently effective artillery

pieces to make a significant impact on the course of the siege. Given the similar role that artillery played in the 1123 siege of the same city it would fit that the location or defences of the city made artillery awkward or irrelevant in an attack on Jaffa. The patterns evident in Fulcher's artillery terminology, which have been discussed elsewhere, suggest that he was not making any attempts to convey much specific information with his choice of term, as they are consistently of a general nature.[76]

One of the possible mentions of artillery in William of Tyre's account of the siege is a reference to the use of *balistae* but, as has been pointed out above, William's account has such a strong and pronounced classicising tendency that the references to *balistae* in his work should be approached with scepticism.[77] They are as likely to be a manifestation of his classical learning as an informed and considered attempt to depict accurately the exact types of machinery that were present in the siege. Following on from this artillery reference there is a mention of the throwing of stones. It is not clear, however, if this stone throwing was undertaken by artillery, either the *balistae* or other artillery pieces, or by hand.

SIEGE OF JAFFA (1123)[78]

This very short siege of Jaffa lasted a mere five or six days. The confusion about the length of the siege arises from the conflict between Fulcher of Chartres's account, which asserts the siege was five days long, and that of Ibn-Muyassar who states the siege lasted for six days.[79] Similar to the 1115 siege of the city, the 1123 siege of Jaffa was carried out by Fatimid forces based in Ascalon and, like that earlier siege, the efforts of the Fatimids in 1123 ended in a failure to capture the city.

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[76] See above, 'Fulcher of Chartres', pp. 55-56.
[77] See above, 'William of Tyre', pp. 86-88.
[78] S. Runciman, *A History of the Crusades*, II, p. 166.
[79] Ibn-Muyassar, *Extraits d'Ibn Moyesser,* RHC, Or, III (Paris, 1884), p. 469.

Fulcher of Chartres, p. 661-3:

> Babylonii autem navigio suo Ioppem inruentes et de navibus pompatice cum ingenti sonitu aerearum tubarum exsilientes, urbem obsidione circumdederunt. et machinamentis suis et instrumentis, quae in navibus maioribus attulerant, continuo erectis, urbem undique adsilierunt et pro valetudine nescia *lapides torquendo* cohibuerunt. Errant enim *tormenta* vehementiora, quibus ultra iactum sagittae saxa torqeubant. pedites nempe Arabes vel Aethiopes, quos secum adduxerant, cum manu mailtum adsultum grandem civibus dabant; alii tela, alii lapides vel sagittas utrobique iaciebant. interni autem externos crebris ictibus saepissime trucidabant, pro se enim viriliter pugnabant. ... cumque murum Saraceni per V dies iam aliquantulum laesissent et minas desuper dilpidando plures diruissent, audito tandem adventu nostrorum, qui eis approximabant, significante bucina certamen dimiserunt et machinamenta sua frustatim in naves reportaverunt.

The use of artillery in this siege is depicted in a very similar manner to the fashion in which it was used in the 1115 siege of the same city. The artillery is described as being employed to restrain the actions of the defenders of the city rather than in an aggressive manner that was aimed at directly bringing about the fall of the city. The machines appear to be exclusively stone throwing engines.

That the besiegers were capable of using artillery against Jaffa in a siege that lasted only five or six days indicates that those artillery pieces were not built at the start of the siege but rather must have been brought to the siege either complete or partially built. This indicates that the Fatimids had at least a comparable logistical capability to that exhibited on occasion by the crusaders.

SIEGE OF TYRE (1124)[80]

The addition of Tyre to the territories controlled by the Christian principalities in Outremer was accomplished by a force led by the patriarch of Jeruslaem and the duke of Venice. Baldwin II, the then king of Jerusalem, was in

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[80] P. E. Chevedden, 'The Invention of the Conterweight Trebuchet', p. 92; R. Rogers, *Latin Siege Warfare in the Twelfth Century*, pp. 82-3; J. Riley-Smith, 'The Venetian Crusade of 1122-4' in G. Airaldi and B. Kedar, eds., *I comuni italiani nel regno crociato di Gerusalemme* (Genoa, 1986), pp. 339-50; S. Runicman, *History of the Crusades*, II, pp. 168-71.

captivity at the time of the siege and was unavailable to lead the army. The timing of the siege was largely dictated by the arrival of a Venetian fleet. The addition of such a force to the otherwise limited military might of Jerusalem presented an opportunity to the crusader kingdom that it could not pass up. The discussions preceding the siege were split into two camps: those who wished to attack Tyre and those who argued that Ascalon would make a more suitable target. According to William of Tyre, they eventually decided the matter by placing two pieces of parchment on an altar, one with Tyre written on it and with other with Ascalon on it, and by having an 'innocent child', through whom the hand of God would presumably work, pick out one of the pieces of parchment.[81] In this manner Tyre was chosen as the target for the campaign.

FULCHER OF CHARTRES'S SUMMARY OF THE SIEGE

Fulcher of Chartres, p. 728-30:
> Quadam vero die, dum in obsidione memorata securi quiescerent qui circumsedebant, opportunitate considerate, egressi sunt de civitate Tyrii, tam Turci quam Saraceni, patefactis portis; et ad machinam nostram inter ceteras fortiorem accurentes nudatis frameis unaimiter adcurrerunt. et antequam nostri arma caperent, quos in machina custodies invenerunt, foras sauciando pepulerunt, et incenderunt eam igni, qua solebant turres antea iactis lapidibus conquassari et vehementissime perforari. in qua impugnatione XXX hominess perdidimus; illi autem duplum reppererunt damnum. cives quippe per muri minas nostros tam sagittis quam spiculis sive lapidibus crebro valde laedebant et vulnerabant.

There is a distinct difference between Fulcher of Chartres's account of the siege of Tyre and that of William of Tyre, as far as the level of detail is concerned. The relevant part of Fulcher's account, above, is remarkably shorter than the extensive account provided by William, which is split up into six case studies immediately below. Fulcher's account is also distinctly different from that of William in that he included no direct mention of artillery by name, although he mentioned that *iactis lapidibus* were used against a *machina* and that the defenders

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[81] WT, p. 577.

on the walls attacked the besiegers with *sagittae, spicula* and *lapides*. There is no clear indication in Fulcher's account that the stones used as missiles by the defenders were thrown from machines rather than by hand. A combination of the two is likely to have been the case and certainly William's account confirms that artillery played a prominent role in the course of the siege. The absence of any confirmed reference to artillery from Fulcher means that this section of his account is of limited use to an investigation into artillery use.

CRUSADER PREPARATIONS AT THE OUTSET OF THE SIEGE

William of Tyre, p. 593:

> Compositis ergo sarcinis et rebus ad quandam commoditatem locates, iuxta portum naves universas educunt ad siccum, excepta una galea, que semper ad suspectos casus, qui emergere poterant, erat parata. Quo facto, ducto vallo profundo convenienter a mari superiori ad inferius, universum claudunt exercitum, tunc sumpta de navibus conveniente material, unde secum Veneti multam detulerant copiam, convocatis artificubus varii generis erigunt *machinas*. Dominus sane patriarcha, cum regni principibus vicem domini regis obtinens, lignorum cesores et architecture peritos convocans, subiecta provotis material castellum edificari precipit multe altitudinis, unde cum his qui in turribus erant pugnari posset quasi cominus et urbem totam liceret intueri. *Machinas* nichilominus *iaculatorias* fabricari precipit, quibus magnis molaribus turres et menia concutiantur et civibus terror inferatur. Dux etiam cum suis partem regiam emulantes, euisdem generis erigunt machinas locisque competentibus componunt erectas. Instant ergo cepto cum omni sollicitudine operi et propositum urgent non deficientes ab incepto, sed magis ac magis accensi cives artant et de machinis urbi molestias inferunt incessanter, assultibus quoque et congressionibus assiduis obsessis requiem negant.

The manner in which William of Tyre describes the preparations for the siege of Tyre stresses the importance of the construction of a *castellum* ahead of the mention that *machinas nichilominus iaculatorias fabricari precipit, quibus magnis molaribus turres et menia concutiantur et civibus terror inferatur*. The account makes it clear that there were similar though separate construction projects carried out by the forces of the king and and Venetian duke. The phrase *machinae ... iaculatoriae* is a general term that could indicate any type of artillery; there is also no indication that only one type of artillery was constructed. It is possible that

various types of hurling machines were built. The missiles thrown by these machines are described as *magnis molaribus*, which would seem to indicate that even if there were several types of artillery constructed that they were exclusively stone throwing varieties though from the information given here it is impossible to determine what exact types of machine were constructed. The lack of a pre-planned and well-stocked siege train is evident here as the account indicates that the besiegers built machines for the siege rather than transporting them to the siege either fully or partially built.

DEFENCE OF TYRE

William of Tyre, p. 593:

> Cives nichilominus ut se tueantur solliciti, cuncta discutiunt ut a se nostrorum propulsent iniurias et hostibus dampna inferant. Erigunt ergo ipsi deintus e regione *machinas* et saxis ingentibus earum iactu libratis castells nostra sine intermissione cedunt et circa ea regionem timore molarium emissorum ita sibi vendicant propriam, ut nemo de nostris ibi auderet imorari, sed et eos, <ut> nonnisi cum cursu celerrimo ad eas auderent accedere nec in eis nisi cum maximo discrime commorari. Qui autem in excelsis erant turribus constituti, arcubus et *balistis* tantam inferebant his, qui in castellis et circa machinas eos impugnabant, iaculorum et sagittarum multitudinem tantoque instabant saxorum pugillarium iactu, ut vux etiam manus auderent exere.

William of Tyre's description of the defenders' reaction to the assault methods of the besiegers concentrates more on artillery than his description of the crusaders' assault itself. This difference is understandable considering the more limited options available to a defending army than available to an attacking force. The employment of artillery pieces allowed the defenders to be less passive in their efforts to ward off the exertions of the besiegers. Their artillery pieces, described merely as *machinae*, are depicted as being notably more effective than those of the attackers. Their assaults on the siege-towers of the crusaders had the effect of warding off the crusader assault from the walls and giving the citizens of Tyre control over the area that they were bombarding with rocks (*ita sibi vendicant propriam*). As a result, even though there is no indication that they managed to damage the siege-towers severely, it can be argued that the artillery pieces

employed by the people of Tyre were, at least to some extent, effective in their aim of repulsing the attempts of the crusader forces to take the city but they did not succeed in forcing the besiegers to back away from attacking altogether.

The rocks thrown by the artillery pieces were supplemented by missiles from *arcus et balistae*. As with all references to *balistae* in William of Tyre's work, this turn of phrase must be treated with caution. There are too many influences converging in William's work for us safely to determine artillery typology from his use of the term *balista* and there is the consistent concern that the term is being used to indicate the presence of crossbows rather than artillery. Certainly there is nothing here with which to identify with certainty these weapons as artillery pieces rather than crossbows.

EFFECT OF CRUSADER ARTILLERY

William of Tyre, pp. 593-4:

> Nostri etiam, qui in castellis erant, equipollenter nimis ictus ictibus recompensantes, vim vi repellents, tantam his qui in turribus et supra muros erant positi engerebant laboris necessitatem, ut sepius in die permutati belli pondus sustinere non possent. Qui autem in machinis erant, docentibus his qui iaculandi periciam erant assecuti, tantis viribus tantoque conamine ingentia torquebant saxa, ut muris illisa vel turribus, universa concuterent et pene traherent in ruinam. Excitabatur de collisis lapidibus et cemento dissoluto pulvis tam inmensus, ut his qui in minibus et supra turres erant quasi nubes interposita nostrorum negaret aspectum; siqui autem de missis lapidibus turres aut menia preteribant, in urbem cum impetus lapsi edificia magna cum habitatoribus in minuta redigebant fragmenta.

The effect of the stone-throwers in this siege is described in more detail than is normal for accounts of artillery use. Ignoring the possibly fanciful dust cloud that obscured the vision of the defenders, William of Tyre's account is plain and direct concerning the initial achievements of the crusader artillery at Tyre. The artillery operators were able to hit the walls with some level of consistency but theirs was not a perfect record. A number of the rocks thrown overshot the walls and landed in the city itself. There was no dramatic result of this artillery action. Though damage to the walls was reported, it was not in such a manner that a serious structural

failure in the defences was close to occurring. It is possible, given that the blows wrought by the rocks were having a limited effect on the walls, that there would have been a major breakthrough as a result of artillery action if there had been an investment of a much longer time period. In the absence of direct evidence on that matter, it must remain a point of conjecture.

ORGANISATION OF THE SIEGE DURING EXPEDITION

William of Tyre, p. 596:

> [Due to the impending arrival of a relief force from Damascus, the besiegers were forced to split their troops, some marched out to face the oncoming army, some manned the fleet to ward off any Egyptian naval assault and a final group were left to maintain the siege. Here William of Tyre descrbed the duties of that final group]
>
> ...cives autem, qui de universis regni urbibus ad eandem obsidionem convenerant cum parte Venetorum maxima machinas et castells vigilanter servent et ita efficient, ut et de castellis non remittatur manus pugnantium nec machine desinant solitos impulses importunius inferred et ante porte deficiens habeatur conflictus.

The departure of a significant proportion of the besieging force on an expedition to ward off a relieving attack allowed William of Tyre to shed significant light on the organisation of the siege and the men involved in it. It is clear from the description that the leaders of the siege effort saw it as crucial to leave a sufficient force at the siege to ensure that the siege-engines were operated constantly in attack. The perceived importance of those engines, both the siege-towers and the artillery pieces, is thus neatly illustrated. The sense is also imparted that it took a large portion of the army, perhaps as large as a third of the army, to operate these machines. From this one can surmise that, even when the whole force was present, the operation of the various machines took a large investment of manpower. The connection of a large number of men with the operation of artillery pieces has been marked out elsewhere as one of the possible indicators of traction trebuchet use and, this is thus a machine type that could be posited as having been present at the siege of Tyre.

William of Tyre, p. 597:

> [Following a small sortie from Tyre, a siege-tower was set alight. The besiegers rushed to put out the flame including one particularly brave man who, atop the tower, exposed himself to the missiles of the defenders in his attempts to quench the flames.]

> Quod videntes qui in turribus erant, arcus habentes et *balistas*, omnes in eum manus dirigunt iacientesque certatim in eum, qui positus erat quasi signum ad sagitta<ndu>m, operam consumpserunt: nam tota illa die in propria carne nullam sensit penitus lesionem.

There is more to this story than a simple case of a soldier defending a burning siege engine. William of Tyre is clearly trying to create a sense of divine intervention and blessing with his description of this incident. The description of *balista* use must be treated with scepticism due to the strong classical influences on William of Tyre's work. Consequently, it might be considered tenuous to use this incident as evidence of classical *balista* use in the course of the siege, especially when one considers the constant problem attendant on the use of the term *balista*, which is that there is debate whether it is best understood as a classical artillery type or as a crossbow.[82] The nature of this appearance adds little to the debate, however, as there are few ancillary pieces of information concerning artillery use since the author's main preoccupation here is the theme of divine intervention.

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[82] There are many instances where *balista* was clearly used as to indicate the presence of artillery, even if it is not always clear exactly what form that artillery took. This can be seen at Nicaea and Antioch where *balistae* were described as being employed to throw heads, a feat surely beyond the capability of a hand held crossbow: GN, p. 156, RM, p. 757, see above, 'Siege of Nicaea: Heads Thrown into the City', pp. 119-124; RM, p. 777, see above, 'Siege of Antioch: Turkish Heads Thrown over the Walls', pp. 144-145. There are also two occasions on which Robert the Monk included *balistae* in lists of large machines that were constructed at the outset of sieges. The inclusion of *balistae* alongside, for example, battering rams and siege-towers, shows that Robert considered these weapons as large artillery pieces: RM, p. 756, see above, 'Siege of Nicaea: Construction of Equipment by the Crusaders on Ascension Day', pp. 108-110; RM, p. 775, see above, 'Siege of Antioch: Building of Equipment by the Crusaders', pp. 134-137. Albert of Aachen's account contains an important reference to *balistae* that can clearly be identified as referring to artillery pieces: AA, pp. 120, see above 'Siege of Nicaea: Alternative Siege Tactics applied to Nicaea', pp. 130-131.

William of Tyre, pp. 597-8:

> Porro videntes nostri, quod *machina* interior lapides magnae quantitatis, in castella nostra ita directe jacularetur; et quod utrumque ex magna parte laeserat; quodque non esset in castris qui dirigendi *machinas* et torquendi lapides, plenam haberet peritiam, vocantes quemdam de Antiochia, Armenium natione, Havedic nomine, qui in ea facultate dicebatur instructissimus, subito receperunt eum; qui tanta arte in dirigendo *machinas* et ex eis missos molares contorquendo utebatur, ut quidquid ei pro signo deputaretur, id statim sine difficultate contereret

The accounts of artillery use by crusaders and the crusader states in the first quarter of the twelfth century clearly show remarkable developments in the effectiveness of the machines employed as well as in the strategic positioning of them and the logistical support behind them.[84] As a result, it is intriguing that, a

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[83] R. Rogers, *Latin Siege Warfare in the Twelfth Century*, p. 83.

[84] During the First Crusade, when the crusaders had no logistical base from which to launch their attacks, there are references at every major siege to the construction of siege engines: GF, p. 179, RM, p. 756, GN, p. 145, see above 'Siege of Nicaea: Construction of Equipment by the Crusaders on Ascension Day', pp. 108-110; Rd'A, p. 21, FC, pp. 186-7, AA, pp. 110-2, see above, 'Siege of Nicaea: Construction of Equipment and Attacks on the City following the Battle', pp. 113-117; Rd'A, p. 61, RM, p. 775, see above 'Siege of Antioch: Building of Equipment by the Crusaders', pp. 134-137; People of Lucca, p. 166, AA, p. 238, see above 'Siege of Antioch: Construction of Equipment', pp. 145-146; Rd'A, pp. 166-7, AA, pp. 374-6, RC, p. 674, see above 'Siege of Ma'arrat-an-Numan: Building of Equipment by the Crusaders', pp. 164-166; AA, p. 376, RC, p. 680, see above 'Siege of 'Arqah: Crusader Equipment', pp. 174-180; GF, pp. 461-2, AA, p. 408, GN, p. 275, RC, p. 691, see above 'Siege of Jerusalem: Building of Equipment by the Crusaders', pp. 184-185. This would indicate that they did not travel with any significant siege train during this campaign. That pattern is repeated in the earlier sieges that follow the First Crusade: AA, p. 486, see above 'Siege of Arsuf: Construction of Siege Engines', pp. 235-236; AA, p. 516, see above 'Siege of Haifa: Preparation for the Siege', pp. 240-241; FC, p. 401, see above 'Siege of Caesarea: Preparation for the Siege and Initial Actions', pp. 242-245; AA, p. 670, see above 'Siege of Acre (1104)', pp. 250-251. With the abandoned plan to besiege Sidon in 1106, however, a change is evident as Albert of Aachen reported that King Baldwin I went to Acre ahead of the siege to prepare siege machines: see above 'Abandoned plan to besiege Sidon', pp. 251-253. Direct evidence indicating whether this was an isolated incident or not is sparse although there is some evidence of the presence of a siege train at the siege of Banyas (1144: see above, 'Siege of Banyas', pp. 297-298) and there is a possibility that Tancred used the

quarter of a century after the founding of the crusader states, there was a need to draft in a man from a moderately different social grouping, an Armenian from Antioch, to operate artillery batteries to a higher level than was possible for the personnel available as part of the retinue and army of Baldwin II, king of Jerusalem. It is unclear whether Havedic had an extraordinary gift for the operation of artillery or whether the crusader forces were substandard in their abilities. What is clear is that the introduction of Havedic to the engagement at Tyre had, according to William of Tyre, an important impact on the course of events and the effectiveness of the crusader artillery.

When the introduction of an expert is considered in the light of the proficiency of the crusaders exhibited earlier in the siege, it is understandable why his expert presence was deemed necessary.[85] The attackers could seemingly hit the walls regularly enough to cause some damage but they missed at times and threw missiles over the walls. When their target changed from hitting the walls to hitting specific machines inside the city one can see why they felt the need for more effective aiming and turned to this reported expert. The quality of the use of artillery as a result of the arrival of Havedic seems rather impressive: from a previous state of affairs in which the crusaders were, on occasion, missing the mural structure of the city to a situation in which their artillery was able to target and destroy individual machines, presumably of much smaller scale than a city's walls, is a remarkable improvement in efficiency.

It is noteworthy that in this incident the siege-engines, which from the context can be clearly identified as artillery, are referred to as *machinae*. This confirmation that William of Tyre used *machina*, at least on occasion, to refer to artillery means that there may be numerous other sieges in his account where references to the presence of artillery are hidden in the term *machinae* and are, as a result, lost to this investigation. For any such reference to go unnoticed as a confirmable artillery reference, however, the contextual information would have to be inconsequential enough to make it unclear as to the nature of the engines in

same artillery pieces at Ventula as he did at Cerez, see above 'Siege of Ventula', pp. 274-275.
[85] See above, 'Siege of Tyre (1124): Effect of Crusader Artillery', p. 286.

question and also to make them useless for shedding light on the minutiae of artillery use.

SIEGE OF HASAR (1125)

The siege of Hasar is a minor event in the course of the history of the crusader states in the early twelfth century and is accorded only a short mention in Fulcher of Chartres's account of that period. The siege as carried out by Borsequinus, a Seljuk general.[86]

Fulcher of Chartres, p. 763:

> Borsequinus autem humilem Syriam proculcans et quid ei magis sit commodum sollicite exquirens, Sardanium castrum obsedit. sed nihil illic proficiens, ad municipium Hasar nominatum exercitum suum convertit, quod statim obsessum machinis et *tormentis* vehementissime coercuit.

Much as the account of the siege as a whole is short, the use of artillery in this siege was only briefly mentioned. The use of *tormenta* is descrbed as 'violent' or 'severe' but there is little information besides. There is no indication of the form of either the artillery itself or of the missiles thrown from them. The artillery was not used in isolation but in conjunction with some form of unidentified and unidentifiable *machinae*.

SIEGE OF RAPHINA (1126)[87]

Pons of Tripoli, together with Baldwin II, pursued the siege of this city and brought it under Christian control. Runciman points out that the capture of the city was important to the crusaders as it was in a strategically important position that protected the county of Tripoli as well as communications between Antioch and Jerusalem.

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[86] For a brief biography of Borsequinus see M. T. Houtsma, *E. J. Brill's first encyclopaedia of Islam*, I (Amstelveen, 1913) pp. 226-7.

[87] S. Runciman, *A History of the Crusades*, II, pp. 174-5.

Fulcher of Chartres, p. 799: | **William of Tyre, p. 611**:

cumque rex et comes cum *tormentis* suis lapides oaculando per dies XVIII Saracenos inclusos vehementissime cohibuissent, et urbem reddiderunt et indemnes abierunt.

Rex autem, ut inpiger erat et populi christiani communibus fideliter obtemperans negociis, assumpto sibi honesto comitatu illuc sine dilatione properat. Quo perveniens, comitem ad predictum opus reperit succinctum; unde machinas et que ad impugnandam urbem poterant esse necessaria viaticumque <et victum> ad dies aliquot suffcientem assumentes, premissis pedestribus alis ad partes destinatas expeditions suas dirigunt. Quo pervenientes, urbem iuxta propositum obsidione vallant, primo statim eorum adventu civibus introitum negantes et exitum. Erat autem civitas tum situ naturali, tum etiam inhabitantium paupertate munita modicum multisque fatigata molestiis diu resistere non poterat. Nam idem comes in monte quodam illi contermino presidium edificaverat, cuius incole urbem predictam continuis obprimentes angustiis, usque ad supremum pene defectum eos compulerant. Cum ergo diebus decem et octo eam vehementius impugnassent, cives ad deditionem compulerunt, indulto prius sibi et uxoribus et libris libero exitu et indempnitate promissa.

Although there are some indications that artillery was becoming more effective in the early years of the twelfth century, the siege of Raphina suggests that the artillery pieces employed were still somewhat limited machines.[88] Both the account of Fulcher and that of William are specific as to time spent pursuing the capture of the city: namely eighteen days.[89] In the course of these eighteen days, there is no indication that artillery had any significant impact on the defences of

[88] For examples of the more efficient and effective use of these machines see the analysis of the sieges of Caesarea (above, 'Siege of Caesarea (1101): Final Assault on the City', pp. 245-246), Sidon (above, 'Siege of Sidon (1107): Attack on a Mural Tower', pp. 258-261), Cerez (above, 'Siege of Cerez: Artillery Breach', pp. 272-274), Ventula (above, 'Siege of Ventula', pp. 274-275) and Caesarea (below, 'Siege of Caesarea (1138)', pp. 296-297).
[89] William of Tyre probably followed Fulcher in providing this information and should not be seen as independent confirmation.

Raphina, although it is possible that it was the actions of the artillery that caused the defenders to worry for their safety and to surrender the city. The account of the siege provided by William of Tyre, although longer than that of Fulcher of Chartres, provides no information on the use of artillery.

The account of this siege by William of Tyre, rather than providing information on the course of the military actions of the siege, concentrates on the preparations for the siege. As a result, it is apparent that there was a significant siege train used by King Fulk I to allow for the smooth execution of the siege and to allow for the *machinae* to be readily usable.[90]

SIEGE OF MONFERRAT (1137)[91]

The siege of Montferrat saw King Fulk I beset by Zengi, a Seljuk atabeg who founded the Zengid dynasty whose rising power caused serious probems for the crusader states through the mid-twelfth century. The siege followed a victory in battle for Zengi's forces over those of Fulk. The defeat forced Fulk to retreat to Montferrat to shelter. The siege ended with the surrender of the garrison and the king. Zengi allowed Fulk and his men to depart freely.

William of Tyre, p. 667:

> Sanguinus interea, obsessos contunius urgens molestiis, menia *tormentis* quatiens, machinis molares et saxa ingentia inculatoriis in medium contorquens presidium, domos prosternit interius non sine multa inculsorum formidine: tantis enim eos cautes violenter inmissi, contorta omnimodorum telorum genera obprimebant angustiis, ut iam intra muros nullus tutus as occultandos saucios et debiles inveniretur locus. Ubique periculum, ubique discrimen et mortis imago tremende roeum se ingerebat oculis et mentibusnon decrat repentini timor interitus et casuum presentia sinistrorum.

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[90] King Fulk I of Jerusalem was previously count of Anjou. J. Riley-Smith, *The First Crusaders*, pp. 7-10, 62, 88, 119, 135, 137-9, 149, 162-3, 165-6, 176, 181-7, 243-4, 248.
[91] S. Runciman, *A History of the Crusades*, II, pp. 204-5.

The information on the artillery of this incident is not particularly colourful or enlightening. The term used, *tormenta*, is unsurprising and uninformative and the impact of the machines, destroying buildings inside the walls but not impacting significantly on the walls is unremarkable. The throwing of stones by artillery pieces is normal. There is, however, an occasionally recurring element of artillery use in the crusade sieges that is exhibited here: the terror inspired in those upon whom artillery attacks are inflicted. The most common and conspicuous examples of this phenomenon are those where artillery was used to throw severed heads into or out of a besieged city, an approach demonstrated at both the Nicaea and Antioch during the course of the First Crusade.[92] This example is different: it is not an overt attempt to damage the defenders of Monferrat psychologically. Rather this is a direct assault with rocks that caused 'terror' (*formido*) in the inhabitants of Monferrat. The throwing of large rocks consistently into the city, destroying the buildings there and leaving little shelter from the onslaught is what inspired this terror. As this is an account of a Christian population under assault by a Muslim aggressor, rather than the other way around, William of Tyre's account is filled with empathy for those inflicted with the duress of the situation (any mention of terror in the Christian accounts when a Muslim city was bombarded by artillery entirely lacks the sympathy evident in William's language here). This terror may well have been there, however, no matter what the religion of a population assaulted with a constant bombardment of rocks from an aggressive military force outside the walls and the impact of artillery on both the physical and mental well-being of a beleaguered population must not be forgotten when examining the use of artillery in this period. It is also worth noting that in the sections of William's work that follow that quoted above, famine in the castle was described as the worst element of the blockade and attack. The artillery actions were only one of the problems faced by those under attack, alongside famine and direct troop assaults.

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[92] See above 'Siege of Nicaea: Heads Thrown into the City', pp. 119-124; 'Siege of Antioch: Captured Christians' Heads thrown from the City', pp. 142-143; 'Siege of Antioch: Turkish heads thrown over the walls', pp. 144-145.

SIEGE OF ANTIOCH (1137)[93]

Unlike many of the other sieges discussed in this thesis, the siege of Antioch was contested on both sides by Christian forces. The city was besieged by the forces of the Byzantine emperor, John II Comnenus, who was attempting to assert his overlordship over the recalcitrant ruler of Antioch, Raymond of Poitiers, who was absent when siege occured.

William of Tyre, p. 670:

> Ubi per dies aliquos habitis congressibus nonnullis, Antiocheni in imperatoris exercitum clam sepe, palam sepius irruptiones faciendo dampna eis frequenter intulerunt enormia et cum eis more hostili, non attenta fidei professione, versabantur, imperator quoque versa vice *tormentis ingentibus et machinis iaculatoriis* cautes inmanissimos et inmensi ponderis contorquendo, a Porta Pontis menia cedendo et turres, urbis claustra debilitare et effringere nitebantur.

This siege contains some interesting terms in connection with artillery use. The description of the missiles thrown by *tormentis ingentibus et machinis iaculatoriis* as *inmensi ponderis* is noteworthy. There is a sense in the turn of phrase that these stones were of a larger size than was normal. Does this perhaps indicate a change in the ability of artillery to throw larger and heavier stones than before? It is difficult to argue the point convincingly with such a sparsity of direct evidence and a single turn of phrase by a single author is not enough to make the case. The account also states that the purpose of hurling the stones was *debilitare et effringere nitebantur* the walls of the city. This strong impact is significant but not unique enough to provide the basis for any conclusions about an increased strength of artillery. The artillery used by the emperor when besieging Antioch is clearly important, however, especially when one considers the auxiliary role played by artillery in the course of the 1097-8 siege of the same city.[94] The First Crusade besiegers found very little use for artillery in that siege and certainly were not endangering the walls and towers of that elevated city with their attacks. There is a more important and effective artillery on show at this point in the twelfth century

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[93] S. Runciman, *A History of the Crusades*, II, pp. 212-4.

[94] See above, 'Siege of Antioch', pp. 133-157 and especially, 'Siege of Antioch: Battle at *Waiferii* Gate', pp. 138-142 where the use of artillery came only after several other methods of assault had been attempted.

than was present in the initial years of the crusade movement in the area but there is not enough information to state precisely the manner in which the artillery had improved.

SIEGE OF CAESAREA (1138)[95]

The year after John II Comnenus's subjugation of Antioch, the combined force of the emperor and Prince Raymond of Antioch were involved in the siege of Caesarea. The siege, which was not progressing in the manner in which John had hoped, ended when he accepted a payment from the city's ruler to break off the siege.

William of Tyre, p. 674:

> Transcursis igitur circa partes Cilicie mensibus hibernis, vere iam reducto et gratam exercitibus referente temperiem, missa voce preconia ex edicto imperiali publice mandatur primiceriis, centurionibus, quinquagenariis legionem, iterum cohertes instrui, *instrumenta bellica* reparari, armis accingi populum universum. ... Hic demum machinis congrua provisione dispositis, turres ac menia et infra muros civium domicilia gravium *immissione molarium incessanter* concutiunt et crebris ictibus et vicaria immissorum cautium repitione non sine multa inhabitantium strage funditus deiciunt, in quibus erat defensionis spes maxima, edificiorum munimina.

This section of William of Tyre's work encompasses two distinct parts of the siege of Caesarea: the preparations and the attack. In the brief section detailing the preparations, it is clear that the emperor had a siege train replete with siege engines ready before the start of his campaigns. The logistical capabilities and foresight of the imperial forces are thus exemplified. The description of artillery use at the siege of Caesarea exhibits little new about artillery in this period. The account of the military actions involved in the siege includes mention both of *instrumenta bellica* and of *immissione molarium incessanter*. It can only be assumed that this incessant throwing of stones by the attacking force was achieved through the use of some of those instruments of war. The assaults seem to have been quite effective:

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[95] P. E. Chevedden, 'The Invention of the Counterweight Trebuchet', pp. 92-3; S. Runciman, *A History of the Crusades*, II, pp. 215-7.

the defences of part of the city are described as having been completely overthrown (*strage funditus deiciunt*). It is to be assumed, both from the description of the events quoted here and from the following sections in William of Tyre's work that detail the success of the siege, that only the defences of the suburbs were razed. In the course of the siege the besieging forces were able to capture the suburbs of the city but not the city proper.[96] The siege ended with the emperor accepting payment from the defenders to withdraw. This would suggest that is was the suburban defences and not those of the main city that were breached by the artillery actions depicted in the quoted section. These would most likely have been built on a lesser scale than those that defended the city proper and, as a result, the success achieved here in breaching the walls of Caesarea should be treated with a guarded respect. The actions of artillery at this siege are a continuation of the trends evident regarding the nature and effectiveness of siege weaponry at earlier sieges of the twelfth century.

SIEGE OF BANYAS (1140)[97]

As part of the agreement in the creation of an alliance between Jerusalem and Damascus against the rising force of the Zengids, Banyas was promised to the crusaders. Before they could take control of the city, however, it had to be wrested from the control of the Zengids. It was to that end that a force combining the power of Damascus and the kingdom of Jerusalem invested the city of Banyas in 1140.

William of Tyre, p. 686:

> Ipsi nichilominus interea cum Turcis, eque ferventibus ad congressus cotidianos accinctis, obsesses assultibus urgent assiduis et *machinis iaculatoriis, quas petrarias vocant*, immissis magne quantitatis molaribus menia concutiunt et intra urbem conterunt domicilia; ad hec et telorum immissionibus et multa sagittarum grandine adeo fatigant opidanos, ut nullus infra muros tutus ad latendum inveniretur locus vixque muro et propugnaculis tecti, *contorquentes saxa* aut arcubus utentes, eos qui deforis impugnabant auderent conspicere.

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[96] WT, pp. 674-6.
[97] S. Runicman, *History of the Crusades*, II, pp. 227-8.

These initial actions against the city were followed by the construction of a siege-tower at great logistical difficulty; there is a clear indication that the artillery mentioned in the quotation provided here, was not sufficient for the purpose of capturing Banyas from Zengi, the atabeg of Mosul and Aleppo who founded the Zengid that proved a serious threat to the crusader states, and that a different approach was deemed necessary. This confirms two things about artillery in this period and area. Firstly, artillery was not consistently reliable as a method of gaining entry to a fortified location. Though there were significant successes brought about directly by artillery use in the first half of the twelft century they were the exception rather than the rule and a military leader could be described as foolish to rely solely on artillery. Secondly, artillery was improving in effectiveness. There are moments in the First Crusade sieges where artillery can be seen to have played a secondary role; that was not the case here.[98] At the siege of Banyas, the alliance of Jerusalem and Damascus outside the walls first attempted to utilise the impact of artillery to capture the city before turning to a siege-tower. This shows that, despite the lack of consistency in artillery effectiveness against all standards of fortifications, there was an increased and increasing confidence among military leaders in the capabilities of those weapons. It is also important to note that, although the force besieging Banyas here was a combined Muslim and Christian force, there is no appreciable difference in the description of the artillery than is associated with uniquely Muslim or uniquely Christian sieges.

SIEGE OF EDESSA (1144)[99]

The siege and capture of Edessa was an important milestone in the rise of the Zengid's to increased prominence. The loss of the city to Zengi caused the crusader county of Edessa to collapse and, as a result, all of the Frankish territories in the trans-Euphrates region were taken by Zengi. This famous incident, the consequences of which resonated throughout Europe, was fundamental in the

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[98] See above, 'Siege of Nicaea: Count Raymond's Artillery Assault on a Mural Tower', pp. 124-125 and 'Siege of Antioch: Battle at *Waiferii* Gate', pp. 138-142 and 'Siege of Jerusalem: Artillery Involvement in Siege-tower attack', pp. 194-209.
[99] S. Runciman, *A History of the Crusades*, II, pp. 235-6.

creation of the atmosphere that led to the calling and preaching of the Second Crusade.

William of Tyre, p. 719:

> Vacuam ergo urbem reperiens et ex eo obtinendi maiorem habens fiduciam locates in girum legionibus et legionum primiceriis congrua statione dispositis, urbem vallat, deinde *tormentis et machinis iaculatoriis* menia debilitat et crebris sagittarum immissionibus cives incessanter affligens, obsessis requiem negat.

The siege that was primarily important for launching the Second Crusade as well as bringing about the fall of one of the major crusader states, the county of Edessa, also has some information on the use of artillery in the mid twelfth century. Zengi made use of *tormenta* and *machinae iaculatoriae* in his assaults and these are reported as having weakened (*debilitat*) the walls of Edessa. An impact on this level, it would appear, had become commonplace by the middle of the twelfth century and there are many examples of it. Thus, there is little unique about this siege and the nature of the use of artillery is a sign of the continuing improvement of status of artillery in twelfth century as compared to the role it played in the late years of the eleventh.

SIEGE OF LISBON (1147)[100]

The siege of Lisbon was conducted by King Alfonso of Portugal together with Anglo-French and German crusader groups against the Muslim rulers of Lisbon. The crusaders may have been en route to the Holy Land when they arrived in Portugal to take part in the siege of Lisbon or there is a possibility that there was forward planning between Alfonso and northern Europeans to arrange the

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[100] M. Bennett, 'Military aspects of the conquest of Lisbon, 1147' in J. Philips and M. Hoch, eds., *The Second Crusade: Scope and Consequences*, pp. 71-89; J. France, 'Logistics and the Second Crusade' in J. Pryor, ed., *Logistics of warfare in the age of the Crusades*, pp. 86-92; H. E. Mayer, *The Crusades*, pp. 104-5; J. Philips, *The Second Crusade, Extending the Frontiers of Christendom*, pp. 136-67; R. Rogers, *Latin Siege Warfare in the Twelfth Century*, pp. 182-8; S. Runciman, *A History of the Crusades*, II, p. 258.

expedition.[101] Some of the participants on the crusade did, however, continue to the Holy Land after the completion of the siege. The siege lasted from June to October 1147. As well as the use of artillery, documented below, there were attempts to use both siege-towers and undermining against the besieged city.[102]

Although the siege of Lisbon occurred in geographically distinct circumstances when compared with the other sieges analysed here – it took place on the west coast of the Iberian Peninsula rather than in the crusader principalities – it nonethelss merits a place in the discussion of crusader artillery. The extensive discussions of what defines a crusade are, in a practical sense, immaterial here, as the main focus of this thesis must be on the military nature and context of the events involved in the campaign and not on the ideological and theological character of that campaign.[103] Even though those religious and theoretical elements of the crusade movement form a vital component of crusading studies, the decision whether or not to include the siege of Lisbon in this discussion must be based on its parallels with the military climate of the sieges in the Holy Land. There are a number of reasons why it cannot be ignored here. Firstly, the rich information available from the 'Lisbon Letter' and, more importantly, the *De Expugnatione Lyxbonensi* makes this uniquely detailed amongst twelfth-century sieges with a profusion of evidence for siege procedures in general and artillery usage in particular. Secondly, the context of the siege of Lisbon is similar in many fashions to that of many of the sieges that formed part of the crusades to the East. The siege of Lisbon was a military undertaking by a composite and international collection of armies fighting against the same perceived enemies of Christ with the same associated prejudices and approaches to warfare that fighting that opponent entailed. Moreover, this force was, at least in theory en route to the Holy Land to partake in the Second Crusade and, thus, possessed the same preparations, such as

[101] J. Philips, 'Foreword' in *De Expugnatione Lyxbonensi*, ed. C. W. David, pp. xviii-xx.
[102] On the siege-towers: *De Expugnatione Lyxbonensi*, ed. C. W. David, pp. 146, 158-64. On the mining: *De Expugnatione Lyxbonensi*, ed. C. W. David, pp. 144-6.
[103] For discussions of the development of the early idea of crusade and crusading see: J. Riley-Smith, *The First Crusade and the Idea of Crusading* (London, 1986). For a discussion of the place of the siege of Lisbon, specifically, in the crusading movement see: J. Philips, 'Foreword' in *De Expugnatione Lyxbonensi*, ed. C. W. David, pp. xii-xx.

they were, and mindset of crusaders to the East. Indeed, some did proceed from the success of Lisbon to the failures of the East.

BUILDING OF MACHINES

The Lisbon Letter, pp. 337-8:	De Expugnatione Lyxbonensi, pp. 134-7:
Circa quam figentes tentoria Kal. Julii suburbana euis uirtute diuina adiuti coepimus. Pose haec circa muros assultus uarios non sine magno nostrorum et illorum detrimento facientes, usque ad Kal. Augusti in machinis faciendis tempus protraximus. Siquidem duas turres iuxta littus, unam in orientali parte, ubi Flandrigenae consederant, aliam in occidentali, ubi Angli castra locauerant, magno sumptu muros ciuitatis pateret composuimus. Pontes etiam IIII in nauibus VII per quos nobis aditus super muros ciuitatis peteret composuimus.	Cum autem ibi per dies XV. sedissemus, machinas utrimque facere, Colonenses et Flandrenses suem, aritem, turrim ambulatoriam, nostri turrim ambulatoriam nonaginta V. pedum altitudinis.

These descriptions of the construction of siege equipment by the crusading forces at Lisbon are important for what they do not say rather than what they do. Neither of these works mentions the construction of the artillery that plays a role later in the course of the siege. There are several possible reasons for this and they shed light on the attitude toward artillery of the leaders of this siege effort. Perhaps the artillery was not constructed at this stage. A later reference in the *De Expugnatione Lyxbonensi* speaks of *fundae Balearia* being erected: *Insuper due funde Balearice a nostris eriguntur.*[104] That is not the first mention of the use of such machines in the *De Expugnatione*, however, and there is still the possibility that such siege engines were constructed at this time but that the accounts just do not explicitly mention them. This would be consistent with the attitude toward artillery that is evident in the accounts of the earlier sieges of the crusade movement, an attitude that relegates artillery use to a secondary element of

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[104] *De Expugnatione Lyxbonensi*, ed. C. W. David, p. 142; also see below, 'Siege of Lisbon: Organisation and Effect of the Artillery Crews', pp. 305-306.

poliorcetics. The manner in which artillery is seen in later case studies from the siege of Lisbon itself is also largely consistent with this possibility. At only one point in the accounts of the siege is there a sense that the primary efforts of the besiegers were centred on artillery.[105] More often the attempts to break into the beleaguered Lisbon seem to have focused on the use of siege-towers and undermining. Artillery, it seems, played a supporting role for most of the siege and this is reflected in the otherwise surprising lack of a mention of artillery in these extracts.

ARTILLERY ATTACK ON THE WALLS OF LISBON

***De Expugnatione Lyxbonensi*, p. 134:**

> Colonenses interim et Flandrenses V. *fundis Balearicis* muros et hostium turres temptant concutere. Pactis tandem eorum machinis et ad murum deductis, vix arietem reduxere, ceteris igne et satis contumeliose consumptis.

This section from the *De Expugnatione Lyxbonensi* provides the only occasion during this siege in which there is a sense of artillery being directly used in effort to bring about a point of access into the besieged city. The account of the contingents from Cologne and Flanders using five *fundae Balearia* to assault the walls and towers of Lisbon directly is brief. It suggests that there was some element of confidence, albeit short lived, in the ability of the crusaders' artillery to breach the walls of Lisbon. That the machines failed does not seem to have been as a result of a lack of strength on the part of the engines themselves but was rather due to the effective actions of the city's defenders, who burned the machines of the crusaders. The manner in which the crusaders first attempted to utilise artillery before resorting to the use of siege-towers and undermining, both time consuming endeavours, suggests that the approach of the leaders of this siege was consistent with the developing attitude toward artillery in the Levant. The accounts of sieges such as Cerez and Ventula, in 1110-11 and 1111 respectively, had shown the increasing ability of artillery to damage mural defences, whereas sieges such as that

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[105] *De Expugnatione Lyxbonensi*, ed. C. W. David, p. 134; also see below, 'Siege of Lisbon: Artillery Attack on the Walls of Lisbon', pp. 302-303.

of Banyas in 1144 show a more positive attitude toward artillery, even though artillery actions did not carry the day in the end.[106] The attempted use of artillery to breach the walls, before turning to other methods of assault, fits with that improved opinion of artillery.

NAVAL ASSAULT

The Lisbon Letter, p. 338:

> Pontes etiam IIII in nauibus VII per quos nobis aditus supre muros ciuitatis peteret composuimus. Haec omnia in inuentiones Stephani protomartiris admouentes uento contrario repulsi necnon & *magnellis* quodammodo repulsi naues retraximus.

The repelling of a crusader naval assault using *mangene* by Lisbon's defenders is, as can be seen, only mentioned in passing. Although it is clear that these were artillery pieces of some sort or another, there is no mention of either the nature of the missiles thrown by these machines or of the strength and power they exerted. All that can be deduced from this incident is that the defenders of Lisbon had sufficient artillery machines and organisation to repel a naval assault involving seven ships. These machines are, therefore, likely to have been present in significant numbers.

ASSAULT ON THE CITY

The Lisbon Letter, p. 338:	*De Expugnatione Lyxbonensi*, pp. 134-6:
Deinde nobis ex nostra parte dimicantibus cum Sarracenis, Anglici minus cauti suam turrim custodientes hanc ex improuiso igne succensam extinguere non potuerunt. Interim nos	Turris vero nostra cum iam ad murum fere duceretur, sabloni inhesit immobilis, a tribus eorum *fundis* irremissibiliter per dies noctesque concuss[a]; ubi non sine magno nostrorum labore et detrimento in

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[106] See above, 'Siege of Cerez: Artillery Breach', pp. 272-274; 'Siege of Ventula', pp. 274-275; 'Siege of Banyas', pp. 297-298; 'Artillery from 1099 to the Second Crusade Case Studies: Conclusions – Increased Effectiveness of Artillery', pp. 312-314.

quadam machina murum suffodere coepimus. Quod uidentes Sarraceni igne oleo admixto eandem machinam in fauillam redigebant, magistrum etiam machinae in fractura muri lapidabant. Praeterea mortes innumeras tam *mangnellis* quam sagittis nostris inferentes, ipsi quoque simili morte a nostris multipliciter puniti sunt.

defendendo frustra, post dies quatuor comburitur ab hostibus.

The events described here mark a development in the approach taken by the crusaders in their attacks on Lisbon, moving from an artillery-centred approach to one focused on the use of a siege-tower. This change is perhaps not surprising, given the failure of the previous scheme to take the city through use of artillery. Both these accounts detail the efforts surrounding an attempt to bring an English siege-tower toward the city and, although the terminology of the references to artillery visible in each source is distinct, the two references seem to be to the same set of machines. In talking about the defensive artillery, the 'Lisbon Letter' mentions the use of *mangene* whereas the *De Expugnatione Lyxbonensi* refers to *fundae*. Wherever either the 'Lisbon Letter' or the *De Expugnatione Lyxbonensi* mentioned the missiles hurled by artillery those missiles were stones.[107] Although it is not stated by either source here, there is no reason to assume that this pattern was broken and thus it is likely that stones rather than spears or other missiles, were employed in the bombardment of the siege-tower. It is noteworthy that, according to the *De Expugnatione*, it was not the impact of the missiles that brought about the ruin of the siege-tower. The constant bombardment caused it to be abandoned and it was subsequently burned. The manner in which the wooden tower withstood the crashing of artillery blows for four days is testimony both to the strength of the carpentry as well as to the limitations of the artillery employed by Lisbon's defenders. This fits in with larger patterns evident in the use of artillery in the first half of the twelfth century. Artillery, though sporadically playing a central and influential role in the persecution of sieges, was often inadequate for the tasks to hand.

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[107] *De Expugnatione Lyxbonensi*, ed. C. W. David, p. 142, also see, 'Siege of Lisbon: Organisation and Effect of Artillery Crews,' pp. 305-306; *Ibid.*, p. 162, also see below, 'Siege of Lisbon: Artillery and the English Siege-tower,' pp. 307-308.

De Expugnatione Lyxbonensi, p. 142:

> Insuper due *funde Balearice* a nostris eriguntur, una supra ripam fluminis a nautis trahebatur, altera contra portam ferream a militibus et eorum convictualibus. Hii omnes per centenos divisi, audito signo exeuntibus primis centenis, alii centeni subintrassent, ut inter decem horarum spatia V. milia lapidum iactarentur. Huiusmodi vero actio maxime fatigabat hostes

This section of *De Expugnatione Lyxbonensi* provides important numerical information on two key areas of artillery operation in this era. Firstly, there are unique details regarding the rate of fire the artillery pieces employed at this siege. Furthermore information is provided about the organisation of crews to operate the machines and the numbers involved. The *De Expugnatione Lyxbonensi* states that over the course of ten hours the two *fundae Balearia* involved in this action threw five thousand stones. To achieve this, the men operating the machines had been split into several groups of, we are told, one hundred men each. These groups of a hundred men took it in turns to operate the machines, thus allowing for the constant bombardment of the city without completely tiring out the artillerymen. There is no indication of how long each shift lasted.

According to the *De Expugnatione*, therefore, 5000 stones were thrown over ten hours between two machines. That is, per machine, 250 an hour or 4.166667 a minute, which equates to one stone every 14.4 seconds from each machine, a rate that does not immediately seem unachievable for a traction trebuchet, provided the operators were all well rehearsed. This high rate of fire was doubtless exaggerated but nonetheless presents an image of machines throwing rocks constantly and with a high frequency. This, together with the large number of personnel operating the machines, provides a strong suggestion that these were traction trebuchets, which have a higher rate of fire than counterweight trebuchets. Bennett also points out that the artillery employed at Lisbon were likely to have been traction trebuchets but this is based on the position of the siege in the chronology of artillery development

rather than on the evidence provided by the source for the siege.[108] This would fit with the large numbers of men involved in the operation, as there would have been need for the formation of crews to pull on the ropes providing propulsion for the missiles. The larger the number of men engaged in that task, the more power with which the rocks would have been thrown. Additionally, the fact that 'the enemy were greatly harassed' by the artillery suggests that the primary aim of these *fundae Balearia* was to threaten the infantry defending the city and that the artillery pieces were not involved in attempting to damage the city's defensive structures. This is, perhaps, more in keeping with traction trebuchets than the heavier counterweight trebuchets that were most useful when used against fortifications. It is, however, somewhat inconsistent with artillery use in the Holy Land at this time where, in numerous sieges, the crusaders can be seen to have targeted city walls with artillery pieces. These attacks on defences met with mixed success.[109] Cathcart King also identifies the artillery involved here as traction trebuchets or, in his terminology, *petraria*.[110]

ARTILLERY USED AGAINST THE GERMAN SIEGE-TOWER

The Lisbon Letter, p. 339:

> Et ecce uiris bellicosis turris impleta muro supereminebat, et eadem hora exercitus nostrae parties ad fracturam muri Lothaningis iudicio prima fronte pugnantibus Sarracenos misabili impulsu impetebat. Interim milites regis qui ab arce turris pugnabant *magnellis* Sarracenorum territi minus uiriliter pugnabant usque adeo quod

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[108] M. Bennett, 'Military aspects of the conquest of Lisbon', p. 79.

[109] During the First Crusade there are numerous examples of failed attempts to damage mural defences with artillery assaults; see above, 'Siege of Nicaea: Count Raymond's Artillery Assault on a Mural Tower', pp. 124-125 and 'Siege of Antioch: Battle at *Waiferii* Gate', pp. 138-142 and 'Siege of Jerusalem: Artillery Involvement in Siege-tower attack', pp. 194-209. The sequence of sieges in the half century following the First Crusade, however, saw several occasions where the use of artillery damaged or breached the walls of a besieged fortification: 'Siege of Caesarea (1101): Final Assault on the City', pp. 245-246; above, 'Siege of Sidon (1107): Attack on a Mural Tower', pp. 258-261; above, 'Siege of Cerez: Artillery Breach', pp. 272-274. Also, see below, 'Artillery from 1099 to the Second Crusade Case Studies: Conclusions – Increased Effectiveness of Artillery', pp. 312-314.

[110] D. J. Cathcart King, 'The Trebuchet and other Siege-Engines', *Chateau Gaillard*, 10 (1982), p. 460.

Sarraceni exeuntes turrim concremassent, si quidam de nostris qui casu ad ipsos uenerant non obstitissent.

The description of the artillery pieces of Lisbon's defenders by the Lisbon Letter utilises exactly the same terminology as that applied elsewhere in the letter to the artillery of the crusaders. The noun depicting the machines is *mangene*. The artillery of the defenders was targeted against the *milites* in a siege-tower and succeeded in scaring the defenders of the tower away from their defensive duties. There is no indication of the type of missiles thrown by these *mangene*.

ARTILLERY AND THE ENGLISH SIEGE-TOWER

De Expugnatione Lyxbonensi, p. 160-2:

> ...Comperto autem a Mauris quod nos maris refluvium seclusisset, in duas cohorts per portam predictam machinam pedetenus invasere. Ceteri autem super muros, incredibilis multitudinis, admota lignorum material cum pice et lino et oleo et omnimodis ignium fomentis, machine nostre iniciunt. Alii vero super nos saxorum intolerabilem proiciebant grandinem.
> ... Mane autem facto, machina nostra maris alluvione interim secluditur. Convenientes interim Mauri, alii per portam in nostros proruunt, quo congressu rector de galeata regis precussus interiit, alii a muris saxorum turbine nostros concutiunt, admotis super hec *fundis Balearicis*. ... Ibi vero artifex noster, saxo crure lesus, omni nos sui spe solatii destituit.

The appearance of *fundae Balearia* here describing the artillery of Lisbon's defenders adds little to what can be deduced from the other, more detailed, cases of the term's use above.[111] It is clear that the machines in question were throwing stones and that the main target of the artillery was the personnel on the siege-tower. Both these revelations are entirely consistent with the information presented in the other examples of the use of *fundae balearia* in the *De Expugnatione*. The only piece of ancillary information available from this section is the manoeuvrability of these machines. The artillery pieces in question were not already in situ on the walls

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[111] See above, 'Siege of Lisbon: Artillery Attack on the Walls of Lisbon', pp. 302-303 and 'Siege of Lisbon: Organisation and Effectiveness of Artillery Crews', pp. 305-306.

or constructed there for this purpose, rather, they were moved up to this position (*admotis super hec*).

SIEGE OF DAMASCUS (1148)[112]

The siege of Damascus was led by the forces of Louis VII of France, Conrad III of Germany and the young King Baldwin III of Jerusalem.[113] The siege occurred at the end of the Second Crusade, an ultimately embarrassingly unsuccessful Christian campaign that had suffered dramatic reversals prior to the failed siege of Damascus. Conrad's forces had been routed at Dorylaeum and Louis had also lost many of his troops on the march. The crusade lacked a coherent target. It had been called to avenge the loss of Edessa but the sacking of that city and the death of much of the Christian population as well as the defeat of the crusader armies in Analotia made that an unsuitable target. The decision to attack Damascus, a decision reached at a military council in Acre, is an interesting one. There had been an alliance between the Damascenes and Jerusalem. It was this alliance that saw the crusaders and Damascus fighting together to capture Banyas in 1144.[114] The breaking of these previously amicable relationships has caused some to wonder whether this was not a miscalculation by the crusaders driven by a dogmatic policy pushed by the new arrivals dismissing the pragmatic approach that had built the alliance.[115] Local Christian power struggle issues may also have played a role in the decision.[116] In the sections of William of Tyre's account of the siege discussed below the failure of the siege is attributed to treachery carried out by certain princes

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[112] A. J. Forey, 'The failure of the siege of Damascus in 1148', *Journal of Medieval History*, 10 (1984), pp. 13-23; H. E. Mayer, *The Crusades*, pp. 103-4; J. Phillips, *The Second Crusade, Extending the Frontiers of Christendom*, pp. 218-226; J. Riley-Smith, *The Crusades*, p. 129; S. Runciman, *A History of the Crusades*, II, pp. 280-3; C. Tyerman, *God's War*, pp. 332-5.

[113] J. Riley-Smith, *The First Crusaders*, pp. 83, 103, 146, 166, 242.

[114] See above 'Siege of Banyas', pp. 297-298.

[115] S. Runciman, *A History of the Crusades*, II, p. 281.

[116] C. Tyerman, *God's War*, p. 332.

that had been bribed by the defenders of the city. The actual reasons for the failure are debatable.[117]

One of the most prominent historians writing in this period was Odo of Deuil yet his account has not been included here as it is devoid of comment on artillery.[118] His account of the crusade is mostly concerned with protecting the reputation of his lord, Louis VII, which had been damaged by the failure of the crusade.

ATTACKS THROUGH THE ORCHARDS

William of Tyre, p. 764:

> Equestres porro tam civium, quam eorum qui eis in subsidium venerant, copiae, intelligentes quod ad obsidendum urbem per illas partes noster venturus esset exercitus, ad amnem qui urbem praeterlabitur, accesserant, ut *arcubus et balistis* expeditiones ex itinere fatigatas, et prae sitis angustia laborantes, arcerent a flumine et aquarum maxime necessariam negarent sitientibus commoditatem

The key term in this section of William of Tyre's account of the siege of Damascus is *balistae*. The manner in which the term is employed here suggests that this is not an artillery reference. The weapons in question were being used, alongside bows, to fend off the crusader advance through the orchards to the north and west of the city. This is not the same kind of warfare as has been observed in the course of the other case studies in this section. These are not attacks by machines on the walls or defenders of a fortified position or against the machines or personnel of a besieging force approaching in the open. Rather, these were actions against men in the orchards around the city and there is no indication that the *balistae* used against that force were based on the city's walls. Instead, the sense conveyed by the language of William of Tyre is that these were weapons used by the defenders operating inside the orchards. If this were the case, then a large

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[117] For a discussion of this issue see A. J. Forey, 'The failure of the siege of Damascus in 1148', *Journal of Medieval History*, 10 (1984) *passim*.
[118] Odo of Deuil, *De profectione Ludovici VII in Orientem*, ed. V.G. Berry, (New York, 1948).

classical *balista* would have been unfeasibly unwieldy for such an action and crossbows would seem to fit far better as a interpretation of the limited available evidence.

Given the deficiency of the evidence, it is awkward to come to such a conclusion in a definitive manner based solely on this instance. When one takes into account the broader tendency of the use of the term in William of Tyre's *Chronicon*, however, it is evident that the most likely conclusion is that these *balistae* were not artillery pieces. An investigation of that larger nomenclature shows that William's use of the term is occasionally identifiable with small weaponry such as crossbows and contains no uses for which the most likely conclusion is that the term was used for artillery.[119] His uses of the term are either ambigious, such as the one to hand, or point toward a usage that fits better with crossbow than artillery.

CHANGE OF BESIEGERS' POSITION

William of Tyre, p. 766:

> [The crusaders had been besieging Damascus from one side of the city, which they had fought through orchards to get to. William claimed that the Damascenes, apparently seeing that their position was dire, set about bribing some of the princes of the crusader army to sabotage the siege. These bribed men resolved to convince the leaders of the siege to move the point of attack to the other side of the city and, to achieve that, invented a plausible reason.]

> ... allegant in obposita civitatis parte, quae austrum respicit et quae ad orientem, nec pomeria esse, quae urbi sint pro robore; nec ad murum expugnandum, vallo vel flumine impediri accessum. Murum quoque asserunt humilem, et ex crudis compactum lateribus, primos vix posse impetus sustinere. Ibi nec *machinis*, nec multo opus esse conamine dicunt, sed statim primis congressionibus manibus murum dejici, et in civitatem irrumpere non esse difficile.

Following some initial success in their assaults on Damascus, the Second Crusade forces moved their position from one side of the city to another. Rather than approaching through the orchards as they had been doing, the movement meant

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[119] See above, 'William of Tyre', pp. 86-88.

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that the crusaders were in a more exposed position and, crucially, without an appropriate water supply. The cause of the switch, according to William of Tyre, was the advice of some of some unnamed crusading leaders who had been bribed by the city's defenders.[120] In the course of his description of the fabricated reasons provided by those bought men for the move, William of Tyre describes the wall that supposedly protected the southeastern part of the city as *humilis*. This 'lowly' wall, it was claimed, would not require siege engines to breach but could be pulled down by hand on the first assault. This is a curious statement. Much of the detail in William of Tyre's account of the siege must be recognised as an attempt to explain the failure of the Second Crusade and the siege of Damascus specifically. Though it may be true that his assertion that the siege was on the verge of success and that they would have been triumphant had it not been for the deviousness both of the inhabitants of Damascus and the princes who were bribed cannot be accepted at face value. In a similar vein, the manner in which the use of *machinae* is brought up here is not factual but rather as part of the to and fro of the attempts to ascribe blame for failure of the siege and to keep that blame as distinct as possible from the major figures of the siege, the kings of France, Germany and Jerusalem.

Even if these events occurred exactly as decribed here by William there is no reason to believe that the bribed princes were telling the truth regarding the strength of the defences on the south and east of the city. The failure of the siege following the move around the walls shows that there must have been some strength in the defences on the south and east to thwart the efforts of the crusaders. In addition, there is no indication in the course of this extract to pinpoint what kind of siege engines were meant when William referred to the use of *machinae*. The frequent use of this term across many sources as a general term for siege engines means that it may have been a reference to any of the siege engines current in the mid twelfth century, including artillery. As a result of both the gereral nature of the only weapon term in the extract and the clash of biases both from the point of view of the author and that of those whose ideas he was portraying means that there is little that can be taken from this section about the nature of artillery use in this

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[120] WT, p. 766.

period. There is no strong evidence of any artillery use in the course of the siege of Damascus.

CONCLUSIONS: INCREASED EFFECTIVENESS OF ARTILLERY

The major issue associated with artillery in these case studies, derived from twenty-nine sieges across almost half a century, is the distinct increase in effectiveness when contrasted with the artillery used in the First Crusade. There is a well-defined pattern in the sources of artillery gradually having more of an impact on the walls of various fortifications. The blows of hurled rocks were recorded as having caused structural damage to the walls and towers of Caesarea and Sidon in 1101 and 1107 respectively which was developed upon further in the sieges of Cerez (1110-11), Ventula (1111) and Caesarea (1138) where the accounts state that the effect of artillery barrage was not only to cause some minor damage to the defences but to break them down.[121] These effects are in stark contrast to the anaemic attempts to break down the walls of any of the cities besieged in the course of the First Crusade.[122]

This undeniable change is reflected in a changed attitude on the part of the era's military leaders to artillery. There are a number of sieges where the use of artillery was afforded a more prominent role than it had been in earlier engagements. At the 1099 siege of Jerusalem, for example, Raymond d'Aguilers recorded the use of siege-towers as the major crusader method to gain entry to the city with artillery merely an anjunct:

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[121] See above, 'Siege of Caesarea (1101): Final Assault on the City', pp. 245-246; 'Siege of Sidon (1107): Attack on a Mural Tower', pp. 258-261; 'Siege of Cerez: Artillery Breach', pp. 272-274; 'Siege of Ventula', pp. 274-275; 'Siege of Caesarea (1138)', pp. 296-297.
[122] During the First Crusade there are numerous examples of failed attempts to damage mural defences with artillery assaults; see above, 'Siege of Nicaea: Count Raymond's Artillery Assault on a Mural Tower', pp. 124-125 and 'Siege of Antioch: Battle at *Waiferii* Gate', pp. 138-142 and 'Siege of Jerusalem: Artillery Involvement in Siege-tower attack', pp. 194-209.

Ut autem nostri turres, ad muros ducere coeperunt, ab omni parte volabant lapides excussi a *tormentis*, atque *petrariis* et sagittae ut grando innumerabiles.[123]

Although artillery was used in the course of this siege its use was secondary to the use of siege-towers. When this is compared to one of the latest sieges discussed in this section, that of Banyas in 1144, the attitude to artillery is noticeably different. At Banyas as at Jerusalem, the equipment used by the besiegers was a combination of artillery and siege-towers but unlike at Jerusalem, at Banyas the artillery was initially given far more prominence. Even though the artillery efforts failed to make an impact on the siege and siege-towers were, as a result, constructed as an alternate approach to the problem presented by the city, the fact that the besiegers attempted to use artillery first and foremost before resorting to siege-towers signals a change in the attitude toward those machines.

The cause of this change both in the effectiveness of artillery and in the attitude to those machines must be queried. There are a number of possible explanations for the development. Perhaps more effective types of artillery emerged in this period or perhaps the improved logistical support available to the crusaders allowed the construction of machines of a better standard even if of the same types as were present in the First Crusade. There is also a possibility that the accumulation of experience over the course of the dozens of sieges that took place in the early years of the twelfth century by those operating siege engines allowed for the more effective operation of those machines. It is difficult, however, to point definitively to any one of these possible causes or to create a hierarchy of causes for the increase in effectiveness due to the lack of direct evidence on the matter. There is clear proof that the logistical support behind the crusader war machine improved in this period but there is no evidence to connect this clearly with the improved performances of artillery pieces.[124] Any or all the possible causes put forward above

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[123] Rd'A, p. 338-9; also, see above, 'Siege of Jerusalem: Artillery Involvement in Siege-tower attack' pp. 194-209.

[124] During the First Crusade, when the crusaders had no logistical base from which to launch their attacks, there are references at every major siege to the construction of siege engines: GF, p. 179, RM, p. 756, GN, p. 145, see above 'Siege of Nicaea: Construction of Equipment by the Crusaders on Ascension Day', pp. 108-110; Rd'A, p. 21, FC, pp. 186-7, AA, pp. 110-2, see above, 'Siege of Nicaea: Construction of Equipment and Attacks on the City following the Battle', pp. 113-

may have played a role in this process but one that can be identified with more certainty than the others is a probable increase in numbers of artillery pieces used in the course of sieges of those years where more success is attributable to artillery barrages. Early sieges for which there are numbers provided by the primary sources include the sieges of 'Arqah (1099), where Ralph of Caen said that three artillery pieces were used and Haifa (1100), where Albert of Aachen said that seven artillery pieces were used.[125] Similarly, five artillery pieces were employed in a failed attempt to breach the walls of Lisbon in 1147.[126] This is in stark contrast to the probable twelve machines used at both Cerez and Ventula where breaches were made with the artillery of Tancred.[127] The evidence is, admittedly, sparse but there is a general pattern evident that points to an increase in the numbers of machines applied to the issue. The fact that this increase is particularly evident at two of the key sieges, Cerez and Ventula, where the power of artillery is most apparent is

117; Rd'A, p. 61, RM, p. 775, see above 'Siege of Antioch: Building of Equipment by the Crusaders', pp. 134-137; People of Lucca, p. 166, AA, p. 238, see above 'Siege of Antioch: Construction of Equipment', pp. 145-146; Rd'A, pp. 166-7, AA, pp. 374-6, RC, p. 674, see above 'Siege of Ma'arrat-an-Numan: Building of Equipment by the Crusaders', pp. 164-166; AA, p. 376, RC, p. 680, see above 'Siege of 'Arqah: Crusader Equipment', pp. 174-180; GF, pp. 461-2, AA, p. 408, GN, p. 275, RC, p. 691, see above 'Siege of Jerusalem: Building of Equipment by the Crusaders', pp. 184-185. This would indicate that they did not travel with any significant siege train during this campaign. That pattern is repeated in the earlier sieges that follow the First Crusade: AA, p. 486, see above 'Siege of Arsuf: Construction of Siege Engines', pp. 235-236; AA, p. 516, see above 'Siege of Haifa: Preparation for the Siege', pp. 240-241; FC, p. 401, see above 'Siege of Caesarea: Preparation for the Siege and Initial Actions', pp. 242-245; AA, p. 670, see above 'Siege of Acre (1104)', pp. 250-251. With the abandoned plan to besiege Sidon in 1106, however, a change is evident as Albert of Aachen reported that King Baldwin I went to Acre ahead of the siege to prepare siege machines: see above 'Abandoned plan to besiege Sidon', pp. 251-253. Direct evidence indicating whether this was an isolated incident or not is sparse although there is some evidence of the presence of a siege train at the siege of Banyas (1144: see above, 'Siege of Banyas', pp. 297-298) and there is a possibility that Tancred used the same artillery pieces at Ventula as he did at Cerez, see above 'Siege of Ventula', pp. 274-275.
[125] RC, p. 680; also see above, 'Siege of 'Arqah: Crusader Equipment', pp. 174-180; AA, p. 516; also see above, 'Siege of Haifa: Siege-Tower and Artillery Assault on the City', pp. 241-242.
[126] *De Expugnatione Lyxbonensi*, ed. C. W. David, p. 134; also see above 'Siege of Lisbon: Artillery Attack on the Walls of Lisbon', pp. 302-303.
[127] See above 'Siege of Cerez: Artillery Breach', pp. 272-274 and 'Siege of Ventula', pp. 274-275.

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important and points to these larger numbers as a key factor in the improvement in artillery effectiveness in this period.

The manner in which artillery is described by the accounts of the first half of the twelfth century makes it difficult to discern any information either on the continuation or development of artillery types in the period. There are few enough occasions wherein the accounts are detailed enough in their descriptions of the workings of machines from which to create a clear picture of the mechanisms described. It was a factor of the sheer number of sources available for the events of the First Crusade combined with an element of luck that the identification of specific artillery types was possible on occasion but these opportunities are few and far between.[128] Albert of Aachen described the shooting of *pali* made of iron both at the sieges of Arsuf and of Tyre.[129] The shooting of 'stakes' or 'poles' from an artillery piece or pieces point to a different typology than the traction trebuchets identified elsewhere. It could be argued that the shooting of such missiles points toward the presence of a late classical form *balista* at these sieges or, possibly, the presence of a spring engine.

There is a passage from the work of William of Tyre that gently hints at the use of traction trebuchets during the course of the siege of Tyre in 1124.[130] This suggestion is connected with the numbers reported as being involved in operation of the machines, both siege-towers and artillery, uses at the siege. The connection of an especially large number of men in the operation of artillery has been pointed out as a possible indication of the presence of traction trebuchets due to the teams of men required to pull the machines' ropes to propel rocks toward the city. This cannot be used as full proof, however, as a significant number of men being involved in working these engines may just indicate that there was a particularly large number of machines involved in the engagement.

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[128] See above, 'Siege of Jerusalem: Messenger/Spy thrown toward City', pp. 185-189, where at the siege of Jerusalem (1099) the presence of traction trebuchets was identified.
[129] AA, pp. 488, 832; also see above, 'Siege of Arsuf: Resistance by the City's Defenders', pp. 237-239 and, above, 'Siege of Tyre (1111-1112)', pp. 275-279.
[130] See above, 'Siege of Tyre (1124): Organisation of the Siege during Expedition', p. 287.

CONCLUSION

There are myriad issues associated with sources for the early crusades many of them stemming from the clerical authorship of most of the sources. Despite this, there are several conclusions that can be drawn from the information provided in this thesis.[1] A key issue, perhaps the key issue, throughout this thesis has been an attempt to identify the typology of the machinery in question in each of the narrative sources studied here. The most reliable method for making such identifications is through the descriptions of artillery pieces provided by the various authors or through the ancillary details attached to the descriptions of the actions of such artillery pieces. Apart from a few isolated examples, however, it is not possible to make such identifications definitively; nonetheless, a limited number of deductions can be reached. There is one case in particular in which the identification of a traction trebuchet at the 1099 siege of Jerusalem is as certain as is feasible from the evidence.[2] There are other points at which more tentative identifications can be made, based on the ancillary detail provided by the sources. At the siege of Lisbon, due to the high rate-of-fire attributed to the artillery pieces used there, as well as the large teams of men appointed to operate the artillery, the presence of traction trebuchets has also been postulated.[3] Likewise it seems that there were large numbers of men associated with the operation of the artillery at Tyre in 1124, which may gently point to the presence of traction trebuchets there

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[1] See above 'Section 1, Primary Sources: Background and Nomenclature: Chroniclers of the Early Crusades, 1096-1148', pp. 14-92.
[2] See above, 'Siege of Jerusalem: Messenger/Spy thrown toward city', pp. 185-189.
[3] See above, 'Siege of Lisbon: Organisation and Effect of the Artillery Crews', pp. 305-306.

also.[4] At other points slings are mentioned as part of the mechanisms of artillery pieces. This is a factor that has been identified as an indicator of the presence of trebuchets but it provides no information as to what type of trebuchet may have been present.[5] For other identifications is it necessary to resort to the somewhat less certain method of examining the nature and patterns in the artillery terminology employed by in the various sources for the period.

Despite the close examination of many terms in the course of this thesis, exactly what can be concluded about their meaning is debatable. The solid identifications of typology discussed immediately above were based on the descriptive evidence associated with mentions of artillery use rather than on the terms used to denote the machines. When dealing with artillery terminology, however, caution must be urged with regard to any attempt to draw general conclusions or identify universal rules or systems of nomenclature. The terms must be treated with care due to the awkward nature of the sources and their authors. There is no way to be completely sure that any term used by a particular author indicates the presence of a specific type of artillery piece. Similarly, the idiosyncratic nature of each source means that conclusions across works are also problematic. Simply because the term *tormentum*, for example, appears in numerous works by different authors, it should not be assumed that each author used it to indicate the same specific type of machine. Although there are similarities in how each source uses that term – it is an artillery term after all – one cannot be certain that it was being applied to exactly the same type of machine by all these authors. It is unfortunate that there is no significant survival of administrative documents, as they have been shown by Bachrach as a valuable tool for the investigation of artillery in thirteenth-century England.[6] Bachrach demonstrated that there was clearly an artillery nomenclature in use by administrators in thirteenth-century England that was known and understood both by authors and recipients of

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[4] See above, 'Siege of Tyre: Organisation of the Siege during Expedition', pp. 287-287.
[5] GF, p. 182; PT, pp. 23, 107; BD, p. 27; GN, p. 146; RM, pp. 757, 775; FC, pp. 221, 296; RC, pp. 674, 679, 692; *De expugntione Lyxbonensi*, pp. 134, 136, 142, 162.
[6] D. Bachrach, 'English Artillery 1189 – 1307: The Implications of Terminology' *English Historical Review*, CXXI, No. 494, *passim*.

official documents regarding artillery. Drawing this sort of conclusion, which is possible with administrative sources, is not viable with narrative sources, however, and the investigation of those more problematic sources must be approached differently.

The use of the term *balista* in the narratives of the First Crusade provides the most interesting example of a terminology pattern that could, arguably, point toward the presence of a particular type of artillery during that crusade. The manner in which several authors use the term far more frequently during their accounts of the early stages of the First Crusade, especially during the sieges of Nicaea and Antioch, is too pronounced simply to write off as a coincidence.[7] This phenomenon is particularly striking in the accounts of Albert of Aachen and Robert the Monk. Moreover, given that Vegetius's late antique treatise on military matters, *De re militari*, was very accessible during the Middle Ages, there is a distinct possibility that his description of *balistae* was current at the time of the First Crusade and may have been the meaning in the mind of the authors who used that term in such an interesting fashion in their accounts of that crusade. With these issues in mind, there is a strong possibility that there were *balistae*, in the late classical sense of the term, in use in the early stages of the First Crusade. The manner in which the appearances of the term are collected around the sieges of Nicaea is interesting as these are the two sieges of the First Crusade for which the crusaders received some level of aid from the Byzantines. Consequently, the possibility that the crusaders were provided with *balistae* by the Byzantines has been postulated although it cannot be proven.[8] This terminological evidence for the use of such machines is partially supported by the description by Baldric of Dol of a possible artillery piece hurling *spicula* at the 1097 siege of Ma'arrat-an-Numan, though that is not without problems.[9]

As has been discussed with regard to the artillery of the First Crusade, there were three clearly different uses of artillery pieces in the first fifty years of the

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[7] See above 'Nicaea to Jerusalem: First Crusade Case Studies: Conclusions', pp. 214-225.
[8] *Ibid.*, pp. 223-225.
[9] BD, pp. 84-5; also see above 'Siege of Ma'arrat-an-Numan: Defenders' machine to attack siege-tower', pp. 167-174.

crusade movement: anti-personnel, anti-mural and physiological.[10] The discussion of the use of artillery to breach defences makes it clear that there are continuing examples of the use of artillery to attack both people and defences in the years following the First Crusade but that the use of artillery in a fashion that manifestly attempted primarily and solely to have a psychological impact ceases. That is not to say that there was no mental impact from being assaulted with an artillery barrage in the years following the First Crusade. William of Tyre described how, when Christians were besieged in Montferrat in 1137, the use of artillery by *Sanguinus* terrified them:

> Ubique periculum, ubique discrimen et mortis imago tremende eorum
> se ingerebat oculis et mentibus non decrat repentini timor interitus et
> casuum presentia sinistrorum.[11]

This incident provides a rare case in this era of a Christian force being subjected to a strong artillery assault. It is not surprising that this is an unique example of the depiction of the terror experienced by a force facing what might be termed a 'normal' artillery assault, rather than one specifically designed to spread terror. In the course of the First Crusade severed heads were thrown from siege engines with the clear purpose of causing fear, grief and anguish in the defenders of both Nicaea and Antioch; similarly the throwing of a captured spy toward Jerusalem was intended to have a similar impact.[12] The events at Montferrat, on the other hand, show that the throwing of more usual missiles (rocks) also caused noteworthy fear in the defenders of medieval fortifications. This facet of artillery use – both when overtly intended, as with the throwing of heads, and when a side-effect of more normal methods of artillery use – must not be neglected when considering the impact of these weapons.

The effectiveness of crusader artillery is one area in which relatively strong statements of fact can be made. The early years of the twelfth century witnessed

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[10] See above, 'Nicaea to Jerusalem: First Crusade Case Studies: Conclusions', pp. 228-232.

[11] WT, p. 667; also see above 'Siege of Montferrat', pp. 293-294.

[12] See above 'Siege of Nicaea: Heads Thrown into the City', pp. 119-124; 'Siege of Antioch: Turkish Heads Thrown over the Walls', pp. 144-145. A further example of the throwing of heads at Antioch was provided when the defenders of the city engaged in the same dubious practice, see above 'Siege of Antioch: Throwing of Heads by the Defenders', pp. 137-138. For the throwing of the spy at Jerusalem see 'Siege of Jerusalem: Messenger/Spy thrown toward city', pp. 185-189.

several instances of crusader artillery action causing breaches in mural defences. At the sieges of Caesarea (1101) and Sidon (1107) there were reports of damage being caused to the walls, whereas the sieges of Cerez (c. 1109-11), Ventula (1111), and Caesarea (1138) saw breaches created.[13] What changed in the manner of artillery use to bring this about is a crucial question when examining the use of artillery in the first half the twelfth century. There have been a number of explanations postulated, including that the artillery used in this period was more powerful for some reason than that used in the First Crusade and the sieges immediately following it or that the defences being attacked in these sieges may have been weaker than those subjected to crusader artillery in earlier years. That the defences may have been weaker would fit with the chronology of the development of the crusader states. Several of the more important locations had already been captured by the time that these breaches were created at places of less consequence. In that sense, it is perhaps noteworthy that the walls of more important cities that were attacked in the later years of the era covered by this study – Tyre, Damascus and Lisbon, for example – were not breached. The most likely reason for the apparent development in the effectiveness of artillery in this period, however, is the increase in the numbers of machines used to attack defences rather than any notable increase in the quality or deisgn of those machines. There are not many moments in the course of the First Crusade where the number of artillery pieces used is noted but there are a few isolated incidents. As has been discussed in the conclusion to the last chapter, Ralph of Caen reported that there were three artillery pieces used at 'Arqah in 1099, Albert of Aachen mentioned seven in use at Haifa in 1100 and the *De Expugnatione Lyxbonensi* reported the use of five artillery pieces at the 1147 siege of Lisbon – all three of these examples of the use of small numbers of artillery pieces led to failures to cause any damage to the mural defences of the various cities that were assaulted.[14] This is in stark contrast to what was most likely twelve used at Cerez (c. 1109-11) and Ventula (1111), sieges at both of which attacking artillery

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[13] See above 'Siege of Caesarea (1101): Final Assault on the City', pp. 245-246; 'Siege of Sidon (1107): Attack on a Mural Tower', pp. 258-261; 'Siege of Cerez: Artillery Breach', pp. 272-274; 'Siege of Ventula', pp. 274-275; 'Siege of Caesarea (1138)', pp. 296-297.

[14] RC, p. 680; also see above, 'Siege of 'Arqah: Crusader Equipment', pp. 174-180. AA, p. 516; also see above, 'Siege of Haifa: Siege-Tower and Artillery Assault on the City', pp. 241-242. *De Expugnatione Lyxbonensi*, ed. C. W. David, p. 134; also see above 'Siege of Lisbon: Artillery Attack on the Walls of Lisbon', pp. 302-303.

created breaches in the walls.[15] This increase in numbers, although not backed up by sufficient examples to be entirely satisfactory, provides the best explanation for the increase in the effectiveness of artillery in this period.

The impact of artillery in the first half of the twelfth century is put into context by the more dramatic damage brought about by the actions of some artillery pieces during the siege of Acre (1189-91) in the Third Crusade. That siege witnessed a long and sustained crusader assault on the city's walls. Those assaults included the use of artillery, which was mentioned by the two principal narrative sources of the Third Crusade *Itinerarium Peregrinorum et Gesta Regis Ricardi* and Ambroise's *Estoire de la Guerre Sainte* on numerous occasions.[16] Much of the detail provided by those Christian sources for the siege are backed up and augmented by two Muslim accounts, Bahā' al-Dīn ibn Shaddād's *The rare and excellent history of Saladin* and Ibn-Alatyr's *El-Kāmel Altevarykh*.[17] The effect of those artillery actions was negligible, however, and it was not until the arrival of the kings of France and England, Philip II Augustus and Richard I Lionheart, on 20 April and 8 June 1191 respectively, that real progress was made to the creation of a breach in the walls through the use of artillery. That breach, when it occurred, took a maximum of two and a half months of attacks by the artillery of the kings and brought about the surrender of the city on 12 July 1191. The dichotomy between the effects of the long term artillery barrages before the arrival of the two kings and the barrages after their arrival suggests that the assaults carried out in the wake of the kings' arrivals were far stronger than those that preceded them. Such a difference could be accounted for either by greater numbers of machines being employed or by

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[15] See above 'Siege of Cerez: Artillery Breach', pp. 272-274 and 'Siege of Ventula', pp. 274-275.

[16] *Itinerarium Peregrinorum et Gesta Regis Ricardi*, W. Stubbs, ed., *Chronicles and Memorials of the Reign of Richard I*, Rolls Series, 38, I (London, 1864); Ambroise, *Estoire de la Guerre Sainte*, ed. M. Ailes, *The History of the Holy War* (Woodbridge, 2003).

[17] Bahā' al-Dīn ibn Shaddād, *The rare and excellent history of Saladin or al-Nawādir al-Sultāniyya wa'l-Mahāsin al-Yūsufiyya*, ed. D. S. Richards, (Aldershot, 2001); Ibn-Alatyr, 'El-Kāmel Altevarykh' in *Recueil des Historiens des Croisades: Historiens Orientaux* II (1872, republished England, 1967) in Arabic and French. For an English translation see: Ibn al-Alatyr, *The Chronicle of Ibn al-Athīr for the crusades period from al-Kāmil fī'ta'rīkh*, ed. D. S. Richards, 3 parts (Aldershot, 2006-8).

the machines used being more powerful or superior in some fashion. In the years between the First and Second Crusades increased capacity to damage walls was shown to correlate with an increase in the numbers of machines applied to that task.[18] Although there is evidence for large numbers of machines at Acre, there is also evidence to suggest that the artillery brought to bear on Acre by the two kings was of abnormal size. There is significant anecdotal evidence in the Christian sources concerning the kings' artillery. A particularly noteworthy machine belonging to Philip II was designated by the name *Malam Vicinam* or 'Bad Neighbour'.[19] There was also one called *petraria Dei* or 'God's Stone-thrower', at which a priest was said to have spent his time preaching beside an artillery piece and exhorting people to donate money to aid in the upkeep of the machine and for hiring people to gather missiles for it to hurl.[20] It is arguable that the provison of such unusual pieces of information was a quirk of the extant sources and their authors and that little should be read into them. On the other hand, taking these stories, which emphasise the use of artillery in a manner not seen in the sources for 1097-1148, alongside the significant impact of those artillery pieces, it is likely that something changed in the nature of the artillery use, not just between 1148 and 1191 but between the earlier part of the siege (August 1189 – April 1191) and the section of the siege in which the kings were involved (June – July, 1191). A description in the sources of a continual artillery attack, night and day, on the walls following the arrival of the kings must also be taken into account, as must the large number of artillery pieces used at this time, eleven, as possible reasons for the success of the machines.[21] Nonetheless, a significant impact was made in a short time by crusader artillery against a target that had resisted assaults for some twenty months. This might be explained by identifying the larger more noteworthy artillery pieces of the kings as counterweight trebuchets. This would explain their greater impact and it is quite likely that that machine type was current at the time as illustrated by Chevedden's examination of an 1187 treatise written for Saladin by

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[18] See above, 'Expansion And Consolidation: Artillery use from 1099 to the Second Crusade: Conclusions: Increased Effectiveness of Artillery', pp. 313-315.

[19] *Itinerarium peregrinorum et Gesta Regis Ricardi*, W. Stubbs, ed., p. 218.

[20] *Itinerarium peregrinorum et Gesta Regis Ricardi*, W. Stubbs, ed., p. 219.

[21] Ambroise, *Estoire de la Guerre Sainte*, II, p. 98; *Itinerarium peregrinorum et Gesta Regis Ricardi*, ed. W. Stubbs, p. 218.

Murdī ibn 'Alī ibn Murdī al-Tarsūsī.[22] The apparent lack of these machines among the batteries of the crusader forces before the kings' arrivals could be explained by a lack of the financial power necessary to construct and maintain such large and powerful machines. The lack of such distinctive indicators of change in the years covered by this thesis as well as a general increase in the numbers of artillery pieces being used, which can be identified as the main reason for the increased effectiveness of artillery in the crusades between 1096 and 1148, should be used to suggest that there is no convincing evidence to suggest that counterweight trebuchets, though likely to have been present in the Third Crusade, were used in the period covered by this thesis.

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[22] P. E. Chevedden, 'The invention of the counterweight trebuchet,' p. 76 and p. 87-8, n. 63.

Appendix

Albert of Aachen's artillery nomenclature

Arcu (60 times) [including 'arcus Balearis' 7 times]:

1, xi: 'arcus corneos et osseos'
1, xii: 'arcu et gladio'
1, xviii: 'arcu corneo'
1, xxii: 'arcu ligneo'

2, xii: 'arcu et pharetra'
2, xxi: 'arcu et sagittis'
2, xxvii: 'arcus corneos'
2, xxxiii: 'arcus et sagittis'; 'corneo arcu plurimos'; 'arcu et iaculis'; **'arcu baleari'** (used by Godfrey at Nicaea)
2, xxxix: 'sagittis et corneo arcu'

3, iii: 'arcu et pharetra'
3, xxix: 'arcu corneo et osseo Gallos'
3, xxxiii: 'arcu et sagittarum'
3, xli: **'sagittis et baleari arcu'** (Siege of Antioch, struggle at the Waiferii gate)
3, lxii: 'nervi arcuum eorum'
3, lxiv: 'arcu et sagitta'
3, lxv: 'arcu importunum'

4, viii: 'arcu omnes'
4, xi: 'arcu Armeniorum'
4, xiv: 'gladio et arcu'
4, xxii: 'arcus et sagittas'

4, xxii: 'arcus et arma'
4, xxvii: 'arcu, pharetra et sagitta'; 'arcu'
4, xxxii: 'sagitta et arcu corneo'
4, xxxiii: 'jaculis et arcu'
4, xl: 'arcu doctos et sagitta'
4, xlviii: 'arcus osseos et corneos'
4, xlix: 'arcu et sagitta'

5, xxvii: 'sagittis et arcu'

6, ix: **'baleari arcu intorsit'** (used by Duke Godfrey at Jerusalem)
6, xii: 'sagittis et arcu'
6, xvi: **'baleari arcu'** (used by Godfrey at Jerusalem, probably personal)

7, xxxv: 'arcu et jaculis'
7, lxv: 'in arcu, in hastis, in gladis fulmineis'

8, ix: 'arcu'
8, xiii: 'sagittariis in arcu corneo et osseo'
8, xvi: 'sagittis et arcu osseo'
8, xxx: 'in gladio, arcu et lancea'
8, xxxv: 'arcu et sagitta'
8, xxxviii: 'arcu et

sagittarum'

9, ix: 'in arcu suo'
9, xx: **'arcu Baleari'** (Acre (1103), used by an archer defending a siege tower)
9, xxxi: 'arcu et sagitta et lancea'
9, xxxix: 'arcu et sagittis'

10, xiv: 'arcu et fundibulis'
10, xvii: 'arcu et sagitta'
10, xlvi: 'arcu et sagitta'
10, liv: 'arcum et sagittam'

11, xix: 'arcu et lancea'
11, xxiv: 'arcu et sagitta'
11, xxvii: 'arcu et sagitta'
11, xxxii: **'arcu Baleari'** (Siege of Sidon, used by men inside a siege tower, unlikely to be artillery pieces)

12, iv: 'sagitta et arcu'
12, vi: **'arcu Baleari'** (Siege of Tyre, used from siege tower)
12, xi: 'arcu et sagitta'
12, xv: 'sagitta et arcu'
12, xxxi: 'arcu, lancea et gladio'

BALISTAE, 6 times in 6 chapters:

Chapter	Phrase(s)	Page	Notes
2, xxxv	'balistarum'	120	**Nicaea.** Listed among a set of assault methods, which had failed to create a breakthrough or opportunity to capture the city.
4, xxxiv	'balistis'	298	**Antioch.** Towards end of siege, 1098; anti-personnel. Used in conjunction with 'lanceis'
5, xiv	'balistis'	356	Before final departure from Antioch, siege of 'Pakrad's fortress'; 'quinquaginta milites suorum sequacium eligens, in loricis, clipeis et lanceis, in balistis et sagittariis Armenicis profectus est ad uicinam arcem, in qua noxii predones Pancratii morabantur'
7, iii	'balistis'	488	**Arsuf, 1099.** Refers to the defenders resisting mangonels, 'balistis' and archers. The crusader machines had been built on site at the start of the siege (they took six weeks to build), see 7, i.
7, xx	'balistarum'	514	**Haifa, 1100** Just after death of Godfrey (possibly on 18 July, 1100 according to Fulcher), siege of Haifa 'machinarum' and 'balistarum' to besiege Haifa by land and sea
11, ii	'balistis'	774	**'Arqah, 1108.** Siege of 'Arqah (which had survived an earlier siege). Pressurised with 'machinis et balistis' for three weeks until it surrendered from hunger.

MACHINA, 48 chapters (containing 1 artillery reference – 11, xvi):

Among the frequent references to *machinae* as 'siege-engines' or 'machines' in Albert's work are a number of references to *machinae* as 'schemes' or 'tricks.' The occasions where the term is used in the latter sense have been included in the table below for the sake of completion but are presented in grey to distinguish them from the instances of the term being used to indicate the presence of machinery.

Chapter	Phrase(s)	Page(s)	Notes
2, xxx	'machine'	112	**Nicaea**; 'strues et machine muro Nicee applicarentur'; some machines were effective, others not. Continues to discuss a 'fox' ('uulpem')
2, xxxv	'machinarum' 'machinarum'	120-2	**Nicaea**; Machinis, ballistis and assaults cannot take the city so the Lombard then constructs a 'turrim'
2, xxxvi	'machinam' 'machina'	122	**Antioch**. Lombard's tower referred to as a machine; used as cover to undermine tower; sloping roof; achieves breakthrough. See also 'instrumentum'
3, xx	'machinamento'	170	Edessa: Translates as 'tricks' rather than as a siege machine.
3, xl	'machinam' 'machine'	202	**Antioch**: a 'fox' or covering to allow the crusaders to attack the Waiferi gate.
3, xli	'structura' 'machina' 'machinam' 'machine'	202	**Antioch**: same machine as previous chapter. Also referred to as a 'structura'.
3, lxiii	'machine' 'machina'	238	**Antioch**: Some kind of engine to block bridge over River Farfar and gate into city.
4, xviii	'machinamenta'	276	Antioch: Not a machine but rather a 'stratagem'
5, viii	'machinamento'	348	Machinations or tricks.
5, xvi	'machinabantur' 'machinari'	358	Betrayal or schemes.

Chapter	Phrase(s)	Page(s)	Notes
5, xxx	'machinam' 'machina'	374	**Ma'arrat-an-Numan**, device made from wood found at castle at Talamria. Typology unknown.
5, xxxi	'machinas'	376	**'Arqah**; generic reference to making engines and mangonels.
6, ii	'machine' 'machinas'	406	**Jerusalem**; princes decide that machines, mangonels and battering rams are needed to capture the city.
6, iii	'machine' 'machine' 'machina'	408	**Jerusalem**, they start to build the machines discussed in the previous chapter.
6, iv	'machinarum'	408	**Jerusalem**, passing reference to the machines being built.
6, ix	'machina' 'machine' 'machina' 'ingeniis'	414-6	**Jerusalem**, construction of machines, mangonels and rams completed. Probably the siege-tower(s) used later. Also, 'ingeniis'
6, x	'machine'	416	**Jerusalem**, mentioned in reference to the battering ram which was preparing a path for the machine to the inner walls.
6, xi	'machina' 'machine' 'machinam' 'machinam' 'machine' 'machine'	416-8	**Jerusalem** Siege-tower. Erected. Construction took from Sunday to Thursday. Positioning of men therein mentioned as well as having men in the bottom to push.
6, xii		418	**Jerusalem**
	A. 'machinam' 'machina' 'machina' 'machina'		**A.** Godfrey's siege-tower causes fear. Engine rose above the city walls.
	B. 'machina' 'machine'		**B.** Raymond's siege-tower. Men on it threw rocks and missiles damaging the walls and the defenders. Does this infer an artillery piece on the siege-tower? I used to think of this as an artillery piece throwing stones and 'missiles' and thus it was somewhat problematic, it was a siege-tower, however.

Chapter	Phrase(s)	Page(s)	Notes
6, xv	'machine' 'machine' 'machina' 'machine' 'machina' 'machinam'	422	**Jerusalem** Siege-towers attacked by the mangonels set up by the defenders;Raymond's is damaged and abandoned.
6, xvi	'machine' 'machina'	422-4	**Jerusalem** Godfrey's siege-tower; gold cross on top that the defenders' mangonels cannot hit. Gdofrey has to repair the wicker panels on the tower as they are damaged by the mangonels.
6, xvii	'machinam' 'machinam' 'machina' 'machinam' 'machinam' 'machina' 'machinam' 'machina' 'machine' 'machinam' 'machina'	424	**Jerusalem** Siege-tower. Moved in closer to the walls to avoid being hit by the defenders' mangonels.
6, xviii	'machinam' 'machinam' 'machina' 'machina' 'machinam' 'machine'	426	**Jerusalem** Siege-tower, defenders try to set it alight by throwing a flaming log at it, struggle over a chain.
7, i	'machinas'	486	**Arsuf**. At start of the siege there is a mention of preparing siege-engines and mangonels. No information on typology.
7, iii	'machina' 'machine' 'machina' 'machina'	488-90	**Arsuf**, attacking city with engines with men inside, three-storey tower. Defenders try to set it on fire. Artillery.
7, iv	'machinaque' 'machina' 'machine'	490	**Arsuf**, siege-tower set alight and abandoned.

Chapter	Phrase(s)	Page(s)	Notes
7, v	'machina' 'machinam' 'machina' 'machina' 'machinam' 'machinam' 'machina'	492	**Arsuf**, second siege-tower. Similar construction to first tower, towered over the town walls. Defenders once again managed to burn the engine.
7, xxii	'machina' 'machina'	512	**Jaffa**, siege-tower.
7, xxiv	'machinam' 'machina' 'machina' 'machina'	518-20	**Jaffa**, siege-tower; also referred to as 'eandem turrim', this support both this instance as a reference to a siege and pretty much all the others as the previous reference and the earlier ones in this instance are all in a similar vein.
7, lv	'machinam' 'machina'	564	**Caesarea**, mentions building of a machine, taller than walls.
9, xix	'machinarum' 'machine'	660	**Acre**. Probably a siege-tower; machine of 'height', 'sublimitate'. Reinforcements in the city tried to set the machine on fire.
9, xx	'machinam' 'machina' 'machine'	662	**Acre**, siege-tower. Try to save the burning machine and to defend it but eventually abandon it.
9, xxvi	'machinarum'	670	**Jubayl**, city blockaded and overwhelmed with constant attacks and siege-engines.
9, xxvii	'machinas'	670	**Acre**, initial days spent constructing siege-engines and tormenta.
9, xxxii	'machinis'	680	**Tripoli**, passing reference to engines, a lot of time and effort put into capturing city with engines and weapons but to no avail so he built a castle from which to pressurise Tripoli and to which his men could retreat.
9, xxxiii	'machinatione'	680	Trickery
9, xlviii	'machinamenta'	704	**Jaffa**, Egyptian attack, Trickery.
10, iii	'machinas'	720	**Acre**, building of siege-engines.
10, iv	'machinas'	720	**Acre**, building of siege-engines for 40 days.

Chapter	Phrase(s)	Page(s)	Notes
10, xiv	'machinarum'	732	**Jerusalem** (crusaders under attack). Machines not actually made, typology impossible to identify, generic siege-engines; were to be used with mangonels.
10, xx	'machinas'	738	**Apamea**, siege-engines brought to siege by Tancred.
10, xli	'machinas' 'machinas' 'machinarum'	756	**Durazzo**, engines and tormenta to be made. Defenders throw fire onto the engines.
10, xlii	'machinas'	756	**Durazzo**, Bohemond repeats earlier assaults on city with engines and tormenta but fails to break into city.
10, xlvi	'machininis'	760	**Sidon**, town besieged from land and sea, engines and mangonels brought up (not said to be constructed there) to siege.
10, li	'machinis'	766	**Sidon**, Baldwin abandons siege and burns engines while doing so before returning to Acre.
11, ii	'machinis'	774	**'Arqah**, three week assault on city by engines and ballistas. Successful siege.
11, xi	'machinis'	782	**Tripoli**, city had survived three weeks of attack by engines and mangonels.
11, xiv	'machinamento'	784	**Tripoli**, Trickery
11, xvi	'machine'	788	**Beirut**, 'machine iactus lapidum'. Artillery.
11, xxii	'machinatus'	796	Trickery
11, xxxi	'machinas'	804	**Sidon**, King Baldwin and Bertrand brought in-described engines and tormentas to besiege the city.
11, xxxii	'machinam' 'machine'	806	**Sidon**, siege-tower, had taken several days to build, taller than walls.
11, xxxiii	'machinam' 'machine' 'machina' 'machinam'	806	**Sidon**, siege-tower, attempt by the city's defenders to undermine the siege-tower and to set fire to kindling underground to bring it down. But Baldwin was forewarned and moved the tower.
11, xxxiv	'machinam'	806	**Sidon**,combined with their inability to defeat the siege-tower, the city and its gates being constantly shaken by tormenta caused the defenders to surrender.

Chapter	Phrase(s)	Page(s)	Notes
11, xliii	'machinas'	820	**Cerez**, engines and tormenta constructed due to the strength of the fortified position. Tacred defended his forces with a trench.
12, vi	'machinas' 'machina' 'machinas' 'machine' 'machinis' 'machinas' 'machinam' 'machina' 'machinis'	830-2	**Tyre**, Construction of two engines ordered, they were to tower over the walls, two stories. Both towers used to harass those who ventured out within the city. Protected with ox hides, wicker panels so that they withstood the artillery barrages from the defenders. Defenders seem to try to use a flaming log like that used at Jerusalem, both towers are burnt as a result.
12, xviii	'machinatione'	850	Trickery

MANGENE, 28 chapters, 44 times used, 31 incidents:

Chapter	Phrase(s)	Page(s)	Notes
2, xxxi	'mangene'	112	**Nicaea**; 'duobus tormentis lapidum que uulgo dicuntur mangene'; the mangonels had been used to attack and damage a certain tower but from which not even one stone had been loosened so more 'instrumenta' were used and the wall at last began to reveal cracks and stones fell from it. The crusaders then used a 'testudine' to attack the walls and try to create a breach but they were unable to.
3, xxii	'mangenarum'	174	Citizens of Edessa use along side arrows to shake the walls and doors of a tower when rebelling against the duke who preceded Baldwin.
3, xxv	'mangenis'	178	**Sororgia**; Duke Baldwin (shortly after accession to position of duke of Edessa) besieged town with *mangene* and other weapons.
3, xli		202-4	**Antioch**.
	A. 'mangenarum'		A. *Waiferii* Gate; Turks used *mangene* to try to fend off Christians assaults.
	B. 'mangenarum'		B. A sally from the Turks destroyed a Christian machine so the crusaders instead set up three ballistas at the bridge to attack the *Waiferii* gate and its tower.
5, xxxi		376	**'Arqah**.
	A. 'mangenarum'		**A.** Construction of *mangene* and other engines.
	B. 'mangenarum'		**B.** Defenders fought back with *mangene* of their own.
6, ii		406	**Jerusalem**.
	'mangenarum' 'mangenas'		The leaders, in discussions, concluded that siege-engines and *mangene* would be needed to capture the city.

Chapter	Phrase(s)	Page(s)	Notes
6, iii	'mangenarum' 'mangenarum'	408	**Jerusalem.** Construction of siege machines lasting four weeks.
6, ix	'mangenarum' 'mangenarum' 'mangenarum'	414-6	**Jerusalem.** Night movement of siege-tower and artillery around the city after the procession.
6, xi	'mangenarum'	416	**Jerusalem.** *Mangene* used against the city's walls.
6, xiv	'mangene' 'mangene'	422	**Jerusalem.** Use of artillery to propel a captive towards the city as an execution method.
6, xv	'mangenarum' 'mangenis'	422	**Jerusalem**; defenders' use of artillery – fourteen *mangene* used: nine facing Count Raymond's forces to the south and five facing the forces to the north.
6, xvi	'mangenarum' 'mangenas'	422-4	**Jerusalem.** Defenders trying to knock a golden cross from the Duke Godfrey's siege-tower. They fail but in their attempt one of their rocks kills a knight standing next to the duke by striking him on the head.
6, xvii	'mangenarum' 'mangenas' 'mangene' 'mangenis' 'mangenarum' 'mangenellis'	426	**Jerusalem.** Defenders's *mangene* were causing damage to a crusader siege-tower so the crusaders moved that tower closer to the walls – as a result, the defenders were unable to hit the tower with their artillery as their missiles kept going over or falling short of the tower. The defenders also saw the need to defend one of their mural towers with chaff and cladding to defend it against the action of a crusader *mangena*.

Chapter	Phrase(s)	Page(s)	Notes
6, xix	A. 'mangenarum' B. 'mangene' 'mangenarum'	426-8	**Jerusalem**. **A.** Mentions the failure of the defenders' artillery to hit the duke's tower. **B.** Three Christian mangene mentioned as part of context/atmosphere of the crusaders gaining access to the top of the walls.
7, i	'mangenarum'	486	**Arsuf**. Six weeks of construction of machines and *mangene*.
7, iii	'mangenis'	488	**Arsuf**. The defenders of Arsuf reported as resisting the attacks of the besiegers, including *mangene*.
7, xxii	'mangenas'	516	**Haifa**. City besieged with a siege-tower and *mangene*.
9, xix	'mangenarum'	660	**Acre (1103)**. Stones hurled constantly from *mangene*.
10, iii	'mangenas'	720	**Acre (1104)**. Construction of siege equipment.
10, xiv	'mangenarum'	731	**Jerusalem** (Crusader forces under attack) Use of *mangene* threatened rather than actually used. Two day siege.
10, xx	'mangenas'	738	**Apamea**. Tancred used *mangene*, no specifics.
11, xi	'mangenarum'	782	**Tripoli**, 4 May-12 July 1109. *Mangene* fail to have an impact on the city.
11, xlvii	'mangenas'	824	**Ventula**. Tancred breached the walls of Ventula through the use of twelve *mangene*.

MANGENELLA, 28 chapters, 44 times used, 31 incidents:

Chapter	Phrase(s)	Page(s)	Notes
3, xlvi	'mangenellis'	210	**Antioch**; heads of captured archdeacon and woman thrown from inside the walls back into the area of the crusader camp.
6, xvii	'mangenellis'	426	**Jerusalem**. Defenders of city inside a tower use *mangenella* to throw rocks at the crusader siege-tower.
7, ii	'mangenellis'	488	**Arsuf**. *Mangene* used to attack defenders of city.
7, lvi	'mangenellis'	566	**Caesarea**. *Mangene* reported as having worn down the resistance of the defenders and to have played a role in causing them to abandon the defences. Preceded by mention of 'fundibulis' being used by defenders.
9, xx	'mangenelle'	662	**Acre**. A stone from a *mangenella* killed a certain Reinold when it struck him in the head.
10, xlvi	'mangenellis'	760	**Sidon**, 1107. *Mangene* reported as being applied to the city, their construction is not mentioned.

TORMENTO, 17 chapters:

Alongside the seventeen references to *tormenta* as siege weapons, there are a number of occasions where the term is used with its other meaning: 'torture' or 'torment'. These other occasions have been included below but have been presented in grey to distinguish them from references to *tormenta*.

Chapter	Phrase(s)	Page(s)	Notes
2, xxix	'tormenta lapidum'	110	**Nicaea.** Construction of throwing machines to attack the walls and towers.
2, xxxi	'tormentis lapidum'	112	**Nicaea.** Quite general reference but in conjunction with *mangene*: 'duobus tormentis lapidum que uulgo dicuntur mangene'
3, xviii	'tormentis' 'tormenti'	166	Torture
3, lvi	'tormentis'	226	Torture
4, xxxiv	'tormenta'	298	**Antioch**, the torture of hunger
5, xviii	'tormentis'	360	Torture
6, xiv	'tormento'	422	**Jerusalem**, spy execution in artillery piece, 'tormento cuisdam mangene'
7, v	'tormenta lapidum'	502	**Arsuf**, 'Once more putting together the engine and the catapult for stones, they spent a long time around the walls'; 'Ac rursum machinam componentes et tormenta lapidum, longa tempora circa muros expleuerunt.'
7, xxii	'tormentis lapidum'	516	**Haifa**, city besieged with a tall engine (siege-tower) and 'tormentis lapidum septem que uocant mangenas'
9, viii	'tormentis lapidum'	646	**Jaffa**, city attacked by Egyptians with 'plurimo instrumento et tormentis lapidum'
9, xxvii	'tormenta lapidum'	670	**Acre**, initial days of siege spent constructing siege-engines and tormenta.

Chapter	Phrase(s)	Page(s)	Notes
10, iv	'tormentorum'	720	At **Acre** King Baldwin spends 40 days constructing 'machinas et plurima tormentorum genera', is this the preparation of a siege train before setting out?
10, xli	'tormenta lapidum'	756	**Durazzo**, engines and tormenta to be made. Over several days Bohemond's artillery weaken the ramparts.
10, xlii	'tormenta lapidum'	756	**Durazzo**, Bohemond repeats earlier assaults on city with engines and tormenta but fails to break into city.
11, xv	'tormentis lapidum'	788	**Beirut**, engines and tormenta attack and shake walls constantly for days.
11, xxxi	'tormenta lapidum'	804	**Sidon**, King Baldwin and Bertrand brought nondescript engines and tormentas to besiege the city.
11, xxxii	'tormento lapidum'	806	**Sidon**, defenders fight back with a tormento.
11, xxxiv	'tormentis lapidum'	806	**Sidon**, combined with their inability to defeat the siege-tower, the city and its gates being constantly shaken by tormenta caused the defenders to surrender.
11, xliii	'tormenta lapidum'	820	**Cerez**, engines and tormenta constructed due to the strength of the fortified position. Tacred defended his forces with a trench.
12, vi	'lapidum tormento'	830	**Tyre**, the ineffectual nature of the tormenta in the course of the siege caused Baldwin to have a siege-tower built.
12, xix	'tormentis lapidum'	852	Turkish campaign against many towns, attacks incorporate tormenta.

INSTRUMENTA, once as a clear individual artillery term.

The term *instrumentum* appears frequently in Albert's narrative but only once in a definite artillery manner in its own right. There are also uses of the term in conjunction with other artillery terms – in these instances it is clear that the phrase in Albert's work referred to artillery but it is the other term rather than the use of the word *instrumentum* that makes this dinstiction. Other usages of the word as a general term for a collection of siege machines may well have incorporated artillery but that is not made explicitly clear.

Chapter	Phrase(s)	Page(s)	Notes
1, xxv	'instrumentis'	48	Gathered 'instrumentis armorum'.
2, xxx	'instrumentum'	112	**Nicaea,** In conjunction with the discussion of the 'fox', 'uulpis instrumentum'
2, xxxi	'instrumenta'	114	**Nicaea,** Stone throwing equipment, 'lapidum quassantium instrumenta' – Artillery.
2, xxxiii	'instrumentum'	116	**Nicaea,** In conjunction with the discussion of a ram, 'instrumentum arietis'
2, xxxv	'instrumento'	122	**Nicaea,** The Lombard's machine referred to as a 'mirifico instrumento' (marvellous instrument)
2, xxxvi	'instrumento' 'instrumentum'	122	**Nicaea,** Lombard's machine - an instrument for the crusaders' protection. 'ingenii instrumentum'
3, xl	'instrumento'	202	**Antioch,** tools to use to try destroy the Waiferii bridge.
3, xli	'instrumenta'	204	**Antioch,** the apparatus of mangonels, 'instrumenta trium mangenarum' – Artillery.
5, xxxi			**'Arqah.**
	A. 'instrumenta'	376 378	**A.** In conjunction with mangonels, 'instrumenta mangenarum' being built – Artillery.
	B. 'instrumenta'		**B.** Mining tools, the Christians efforts and instruments were countered by the defenders' own 'ingenii'.

Chapter	Phrase(s)	Page(s)	Notes
6, iii	'instrumentis' (ch title)	408	**Jerusalem**, Chapter title referring to the construction of 'machine, mangenarum et arietis'; all these devices come under the heading on 'instrumentis'.
6, ix	'instrumenta' 'instrumenta'	414	**Jerusalem**, In conjunction with mangonels, firstly 'instrumenta mangenarum'; then 'instrumenta trium mangenarum' – Artillery.
6, xv	'instrumenta'	422	**Jerusalem**, defenders' mangonels, 'instrumenta quatuordecim mangenarum' – Artillery.
7, i	'instrumenta'	486	**Arsuf**, preparation of equipment, 'instrumenta mangenarum' – Artillery.
9, viii	'instrumento'	646	**Jaffa**, Egyptian siege, instruments of war, 'instrumento… ac bellico'

FUNDIBULA

Chapter	Phrase(s)	Page(s)	Notes
3, xxxv	'fundibularios'	194	**Antioch**. Used by Turks during a battle outside the city.
6, i	'fundibulis'	406	**Jerusalem**. At very beginning of siege. Mentioned alongside thrown stones and arrows.
6, xvii	'fundibulis'	424	**Jerusalem**. Mentioned during depiction of Saracen defensive measures against crusader attack with a siege-tower – used alongside *mangenella* in an attempt to damage the siege-tower.
6, xlvi	'fundibulis'	464	Definitely hand held weapons. Not in course of a siege; battle shortly after the capture of Jerusalem.
6, li	'fundibulis'	470	**Ascalon**. Used alongside arrows and *omni genere armorum* by defenders of the city to ward off the crusader forces.
7, ii	'fundibulis'	488	**Arsuf**. Arrows, *fundibula* and mangonels used to assault city.
7, xxiv	'fundibulis'	520	**Haifa** *Fundibula* reported as having palyed a role in causing damage to shields of crusaders. Part of stylistic description of the ordeal suffered by those soldiers.
7, lvi	'fundibulis'	566	**Caesarea**. Defenders, on a second line of defences in the city, were eventually overcome by use of *fundibula* together with arrows and burning stakes.
9, iv	'fundibulis'	640	Reported as having been used in the course of a battle near mountains of Jerusalem.
9, l	'fundibulariis'	710	Used at the port of Tripoli, where William Jordan tried to stop movement of Saracen ships into the city.

Chapter	Phrase(s)	Page(s)	Notes
10, xv	'fundibulis'	732	Ascalon's navy. Used alongside lances and bows by Christian forces in struggle over control of a ship.
10, xli	'fundibulis'	756	**Durazzo** Used by defenders of the city in attempt to ward off the attacks led by Bohemond.

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