Crumbling Castles

Exploring the differentiation between besieged and non-besieged castles using military material, with a case study of eight castle in the county of Holland during the period 1250 – 1450.

Part 1

Casper Johann van Dijk

Casper Johann van Dijk
Address: Vrijheidslaan 822
E-mail: cjvandijk1193@gmail.com
Tel. : + 31 629483187
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Casper Johann van Dijk, s142854

cjvandijk1193@gmail.com

Supervisor: Drs E.J. Bult

Northwest-Europe

University Leiden, Faculty of Archaeology

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1. Introduction

Nothing speaks more to the imagination of the medieval period than castles being besieged by knights rescuing princesses. This is romantic view, since the castles as a military stronghold is highly debated and the exact purpose of castles is a question where scholars have pondered about the last century. A general accepted definition of a castle is:

A castle is a medieval structures that combines living and defensibility for a small group of persons consisting of a small noble family up to a small military garrison. Essential is the dependence of this group of individuals to one person, family or institution (Janssen 1996, 16)

This variation of castle function as a military or civil structure is based on the interpretation of the structure by various scholars and can range from a tradition view, the castle as an almost primarily military structure (Gies and Gies 1975, 187; Platt 2007), to the interpretation of the castle as a more, and almost pure, symbolic structure (Coulson 1979; Johnson 2002; Wheatley 2004; Lidiard 2005). This symbolic function of the castle is based upon the utilization of the castle as an expression of wealth and knighthood of the master of the castle and could be used to impress the nobility with their grand designs (Pounds 1994, 296; Janse 2001, 114). However, the majority of scholars agree that castles had, however small that may be, a military function. Consequently the precise function of the castle is a balance between living and military function. This balance can shift between 95% living and 5% defensibility to 95% defensibility and 5% living (Janssen 1996, 17). By determining the military or civil function of the castle it is possible to determine the other function, since there is a balance between all functions.

The function of the castle has been primarily determined using historical sources or archaeological research into the structure and design of castles. The use of these sources poses certain complexities and limitations to determine the function, and especially the military function, of castles. Traditionally archaeology used the structure of the castle to determine the function of the castle. The design and layout of the various areas and halls determining the function of the castle. Essential in determining the military function of the castle was the thickness of the outer wall and the wall of the tower(s) of the castle. This method is based upon historical sources describing what wall

thickness is accepted as defensible (Janssen 1996, 16). The concept of defensible is variable and is dissimilar through time and context, and is dependent on the social standing and foes of the castle owner (Janssen 1996, 17).

The primary historical sources used to determine the military function of castles are chronicles, and accounts or bills (Verbruggen 1977, 1-5; 12-15; 19-22). These sources provided information on the use of the castle as a defence structure by means of providing data on the equipment and might use to assault and fortify castles during siege warfare. The description provided by chroniclers on sieges, and medieval warfare in general, have a tendency to exaggerate reality for political purpose by virtue of their commissioner, making interpretations based on chronicles complex (Hebron 1997, 1; Howel 2001, 67). It is possible to use accounts and bills to determine the expenses disbursed and equipment utilized during sieges, giving insight into the military prowess needed, or significance, for a commander to conquer a specific castle. Therefore, giving insight into the military function of that specific castle. The complexity with using accounts and bills is the lack of descriptive detail on the specific material described. For example the equipment bought for the siege of the castle of Polanen in 1351, in Holland, by Willem V include 5000 *pielysers* and 300 *ongheyserde scachten* (De Graaf 2004, 338). The translation of these words in modern language can prove difficult. *Pielysers* can be roughly translated into arrows. However, the dimensions and the device shooting the arrows are not mentioned (http://gtb.inl.nl/ lemma: piel). The words *ongeheyserde scachten* translates to shaft without iron (http://gtb.inl.nl/ lemma: scachten). The precise application of these shafts is unknown. The shafts could have been used to produce more or different arrows, or could be used for the production of pole arms. However, it is certain the shafts needed a metal part to be used as weapon, or else it was not possible for the weapon to penetrate contemporary armour worn by enemy combatants (Jones 2014, 70; Blair 1958, 53-77).

As a result of the limitations of both traditional archaeological, i.e. outer and tower wall thickness, and historical research into the military function of castles a different method could be deployed to determine the military function of castles. Little research has used the military material culture excavated at the castles to determine if the castle was besieged and what siege techniques were utilized during the siege to prompt insight into the military function of the castles. In this thesis a case-study of eight archaeological excavated castles, consisting of besieged and none-besieged castles, are examined to

conclude if it is possible to determine if a castle is besieged by analysing the military material culture excavated at the castles. In addition, an effort is made to determine the military function of the studied castles using the military material culture excavated at the castles, in conjunction with the military use of the castle, i.e. the use of the castle during siege warfare. Therefore, the following research question will be answered in this thesis:

How is a siege visible within the excavated military material at castles in the county of Holland during the period 1250-1450, is it possible to determine the siege techniques used to besiege the castles using military material culture, and is an alternative differentiation possible between castle types using military material? And are there suggestions for further research into this topic?

The examined castles were selected on various criteria. The primary criteria for the selection of the studied castles is presence of military material culture at the castles, excavated during archaeological research. The geographical limitations of the selected castles in the case-study are based on the restrictions and laws on castle building under the same political ruler, i.e. the count of Holland, and the presence of concurrent castle types in the same geographical area. While, the restrictions in time are based on the emergence of the castle types and when the last of the castle types were constructed. After this period newer, more advanced, defensible construction were constructed to provide sufficient cover against the increasing fire power of firearms (Janssen 1996, 125). The selected castle types are: moated sites, keep towers and square castles (Janssen 1996, 56; 85-7; 96). All excavated military objects are presented in a catalogue accompanying this thesis. Provided that a typological dating is possible it is provided in this catalogue.

1.1 Reading Plan

The plan for this thesis is as follows. Chapter 2 describes the military role of castles to understand why castles were be besieged. In addition, the different castle types present in the county of Holland during the period 1250-1450, and the social standing of the respective castle lords, along with their military obligation are described. The morphological features of the castles, i.e. castle types, and social context of the owners are present to gain insight into the possible military actions commenced at the different castles types.

Chapter 3 the different types of siege methods and the development of siege warfare during the late medieval time period is discussed. As a result, the examined military material culture can be linked to a specific siege method and placed within the development of siege warfare.

Chapter 4 provides the definition of military material culture and the different categories of military material culture that were excavated at the examined castles. Furthermore, the difference in deposition chance of military material culture during a siege and non-military period are examined, to provide a theoretical framework for the expected difference in the deposition of military material culture, between besieged and non-besieged castles.

In chapter 5 the history of the examined castles and the archaeological research at the castles with the excavated military objects are presented. Along, with the known data on the conflicts were the castles were involved in and the sieges occurring at the castles, hereby providing a historical background for the apprehension of the deposition of the military objects and the limitations of the archaeological research at the studied castles.

The results of the previous chapters are discussed in chapter 6. Comparing between the military material culture excavated and historical sources on sieges occurring at the examined castles and placing the excavated military objects within the theoretical framework provided in chapter 4.

Finally, in chapter 7, the conclusion and suggestion for further research, the main research question is answered, along with recommendations for future research.

2. Castle types, military functions and social aspects

Castle structures appeared in many forms and designs. The difference in the design choices was based upon the function desired, and wealth and status of the castle builder. This difference in form of the castles materialised in difference in material, splendour and military role of the castle. To fully understand these differences in castle structures and their supposedly design choices, this chapter describes the military role of the castle, the different castle types present in the county of Holland during the period 1250-1450, and the respective social standing and military obligations of the castle lords.

2.1 Military role of the castle

Apprehending the role of the castle in medieval warfare is vital to grasp the reasons why castles were besieged and to what length medieval rulers were determined to conquer castles. The military role of the castle within medieval warfare is to maintain control over a selected area, by providing defensive and offensive capabilities for a castle lord (France 1999, 78). This military role changes through time, but can be roughly divided in a passive, i.e. defensive, and an active, i.e. offensive, role (Jones 1997, 164-5). The defensive role of the castle is to use the castle as a structure to defend a group of individuals against an attacking force (Purton 2010, 94). The castle can be used by his lord to protect oneself and his family, or be used by the surrounding vassals and their families as a shelter to retreat to. The offensive role of the castle is to control the surrounding countryside by providing a staging ground to launch a (counter) offensive from (Porter 2000, 43). The castle functions as a barracks for troops to be garrisoned in. Famous castles specifically build to maintain control over an area are the citadels built by Edward I to control the Welshman and the derived *dwangburchten*, build by Floris V in West-Friesland, to control the West-Friesen (Davies 2000, 338; Bakker *et all* 2010; Janssen 1996, 57). Both castles groups were built to control the respective populations of Wales and West-Friesland after their defeat in 1277 and 1282.

The two roles from the castles are fulfilled by two different factors: the garrison of the castle and the morphological features of the castle. The garrison of the castles consisted of an armed force which executes primarily the offensive role of the castle. The castle performs as an offensive base to launch counter attacks from and to resupply the friendly troops (Jones 1999, 164-5). The morphological features of the castle are the primary aspect of the defensive role of the castle. These features provide the defending

force with protection against enemy artillery, sieges engines and attacking troops. However, these two aspects cannot be seen independently from each other. The offensive role, performed by the garrison of the castle, can only function provided that the castle is suitable for housing a minimal amount of combatants, which is depended on the morphological features of the castle. The other way around, with the absence of the offensive attributes of the castle, i.e. the absence of any military garrison, would render the castle completely defenceless. Morphological features provide shelter from incoming missiles and can hinder an attacker from easily entering the castle. However, human intervention is needed to completely stop an assault on a castle, by providing counter-battery fire or physical dominance.

2.2 Castle types

A large array of different castles types existed in Holland during the period 1350-1450 (Janssen 1996, 18; Bult 2001, 29-33). Enabling the possibility to compare these different castle types mutually on military function, several castle types have been grouped into three types, for clarification. The grouping and differentiation of these types has been done according to the morphological features and the social status of the owners of the castles. The morphological differentiation is based on the typology made by H.L. Janssen (Janssen 1996). The morphological feature for determining the different type of castles are: wall thickness, outlining of the castle and internal division of the castle (see figure 2.1. for standard castle design) (Janssen 1996, 17-8).

Type 1: Square castles (Vierkantekastelen)

Square castles were structures originally built by the elite nobility and the count of Holland. The castle design consisted of a square outline with four towers on the corners, with the living quarters usually situated against the back and side wall, and with the absence of a main keep. Most of the excavated Square castles have a forecourt. There is a large variety of designs that are defined as square castles, although all castles have the square design and the four towers, in varying sizes, in common. The main area of the complete castle is approximately between 25x25 m and 45x45 m large, with a moat of minimum 8 or 10 m wide, and outer walls with a thickness up to several meters (Janssen 1996, 62-3).

The castle design was introduced from France, were the design was developed for the royal court, during the 13th century (Van Reyen 1965, 71-115; Janssen 1990, 238-244).

The square castle was introduced in the county of Holland in the last quarter of the 13th century, with the large construction project of *dwangburchten* by Floris V in West-Friesland after the conquest of West-Friesland (Renaud 1955, 126; Janssen 1996, 56; Bakker *et all* 2010), and were in use up to the end of the 15th century (Janssen 1996, 18). Square castles could combine military and residential functions perfectly. However, they were expensive to construct and the builder of the castle had to have had enough military and political power to be permitted, and to be able to perform the construction (Janssen 1996, 62). As a result, the square castles could only be constructed by the count himself and the nobility directly surrounding him. From a morphological view the square caste had a high military relevance; it was designed to resist sieges and maintain a high number of soldiers as garrison.

Type 2: keep Towers (Zaal- en woontorens)

Keep towers were the castles of the lower nobility that were not wealthy enough or had the social power to construct square castles (Janssen 1996, 96). Keep towers consisted of a main keep, between 5x5 m and 15x15 m large, placed upon an elevated island surrounded by a moat of at least several meters wide, and a second area, occasionally as well surrounded by a moat, with agricultural structures. The walls of the main keep could vary between 1 a 2 meter thickness and the complete area was almost never fully surrounded by a wall (Van Reyen 1965, 116-32). The first keep towers start to appear around 1250 and after 1450 the keep towers were no longer constructed (Janssen 1996, 18). The size of the towers varies; the first towers built were the largest towers with a size of around 13x13 m, measured around the outside of the wall. The smallest towers had a size of approximately 7x7 m (Janssen 1996, 85-7). The outline of the main keep of keep towers consisted mostly of a square or rectangular design (Janssen 1996, 87). Nearly all surviving keep towers are absorbed in a larger structure and are only recognisable by archaeological or building archaeological research (Janssen 1996, 88). The morphological defensibility of keep towers was limited to the keep itself and the moat surrounding it. However, it is possible that the main island or the fore keep were surrounded by a wall, of 1 or meters thick.

Type 3: Moated sites

A large part of the lower nobility in Holland did not have the financial power to construct a full scale castle, but still wanted to benefit from the financial and social advantages of being a member of the nobility. Because, one of the criteria to be accepted within *welgheborenen* was to live on a homestead with a moat and a drawbridge (Janse 2001, 80). As a result, moated sites were designed to resemble a castle and meet the criteria of the homestead of the nobility, enabling to be accepted as a member of the nobility (Janssen 1996, 96). Therefore, moated sites are structures that resemble the design and features of a castle, however, are, from a morphological viewpoint, not realistic defensible. Moated sites start to appear in the beginning of the 13th century, and disappear around the turning of the 15th and 16th century (Janssen 1996, 18). They consist of a main keep build upon a moated island with structures with aboveground masonry of max. 60 cm thick (Janssen 1996, 96-98). From a morphological approach the defensibility of the castle is very low. The walls of the main keep were too thin, maximum 1 metre, to withstand a large scale siege attack with siege engines. Consequently, the moat is the only real defensible morphological element within the structures.

2.3 Social standing of the castle lords

There is a large differentiation within the ranks of nobility in Holland during the late Middle Ages; from lower lords which controlled a small area, up to the higher elite which could rival with the count of Holland, in administrative structure, land, social standing and income (Janse 2001, 93-5). This difference in social rank is based on the feudal society existing in the late medieval period (Kieft 1974, 193-4). The feudal system is a complex system of social, administratively and political relationships between lords and their vassals. The explanation of this complete system is beyond the aim of this thesis. However, it is important to understand the difference in ranking and the military obligations among the nobility in Holland. The presented differentiation of nobility in Holland during the middle ages is based on the research of A. Janse (Janse 2001).

The different social standings in nobility in Holland during the 14th and 15th century were from higher to lower standing: *baanderheer, ridderscap* and k*naap/welgeborenen.* All these standings were part of the *welgeborenen* of Holland, although it is possible to achieve extra titles. A *welgeborenen* could become a member of the *ridderscap*, if his family was a member of the *ridderscap* and if he lived like the *ridderscap* demanded.

One of the criteria to be accepted within *ridderscap* is to live on a homestead with a moat and a drawbridge (Janse 2001, 80). A member of the *ridderscap* could become a member *welgeborenen* again, if he failed to meet the living standards of the *ridderscap*. A *knaap* is an individual part of the *ridderscap,* but an individual that, thus far, not had been knighted and became a full member. Several individuals within the *ridderscap* in the Holland stay their whole life a *knaap* (Janse 2001, 87-9). The highest rank within the nobility of Holland, in addition of the count himself, is a *Baanderhee* or *Baron*. The difference between *baanderheer/baron* and *ridderscap* can be found in the military organisation of the army of the count. The *Baanderheer* was a title for a higher class within the *ridderscap* and a military rang. A *baanderheer* was supposed to fill a banner with at least 50 soldiers and had the command over knights and squires, so a *baanderheer* was still part of the *ridderscap.* However, was an extra title granted to the highest nobleman (Janse 2001, 83-5; 252).

As illustrated, the military organisation in Holland was primary based upon the ranks of the nobility. Furthermore, the nobility were the backbone and primary force of the count of Holland (De Graaf 2004, 36). Within the medieval feudal system the bond between a lord and his vassal meant mutual obligation towards one another. The primary obligations of a vassal toward his lord was to service and to aid his lord with military service and advise when called upon (Stephenson 1942, 22-32). Consequently, the bond between vassal and lord could be layered (Blockmans and Hoppenbrouwers 2006, 390-1). For example, a high noble, *baanderheer,* could grant land to lower noble man, this lower noble became the vassal of the *baanderheer* and on its turn granted land to several other nobleman, whereby the noble became vassal and lord at the same time. As a result, if the *baanderheer* called upon the noble to fulfil his military service, the noble called upon the other lower nobleman to fulfil their military services as well; forming a pyramid form of military obligations. In addition, the count of Holland could call upon all his vassals and servants to serve him in a war, called the *heervaart* (De Graaf 2004, 36-7). Therefore, a conflict in feudal obligations could occur if a conflict erupted between the count and a feudal lord; a nobleman could be obliged to serve the count by *heervaart*, but as well serve his lord by feudal service.

Not only fought the nobility for and with their lord or count, several conflicts could occur among the nobility themself, called *kleinkrieg* (Glaudemans 2004, 51). The motifs of these wars and conflicts were mostly apropos of power and wealth in an selective area.

The conflicts consisted of raiding the estates and countryside of the opposing lord. Several conflicts that could be described as *kleinkrieg* during the 14th and 15th century the county of Holland and Zeeland were all among the high nobility, mostly among individuals with the title of *baanderheer*. This is not surprising, since they had the financial and political power to start and maintain a large conflict or war (Glaudemans 2004, 59). The lower nobility did not have the capital to maintain a large(r) force needed to perform raids or the political power to justify the conflict.

The difference in 'ranks' within the nobility from Holland and the accompanying differentiation in wealth and social status materialises in the different castles types used by this nobility (Janse 2001, 114). During the 13th and early 14th century the three main ranks described can be loosely coupled to the three types of castles used within this thesis: square castles were built by *baanderheren* or *barons,* keep towers by the *ridderscap* and moated sites by *welgeborenen* without any extra titles. However, during the 14th and 15th century there a discrepancy arises between rank and wealth. Several high ranking nobleman become poverty-stricken, while individuals from the *ridderscap* became extraordinary wealthy. Therefore, problems can occur when coupling the morphological features of a castle to the social standing of the owner. Within the same standing or rank different castle type can be owned by members of the same nobility rank. Over time, the owner of a castle can change into a new owner with a higher status, or the family owning a castle can rise in social standing and can add new features to the castle, in line with their new standing. Also an owner could decline the social rank but stay on the same castle. Therefore, the rank of the initial commissioner for building the castle could have been in line with the expected social rank accompanying the castle type. However, a differentiation between *de facto* rank of a castle owner and the expected rank, according to the castle design, can occur overtime. Consequently, it is imperative to understand the development of the rank and wealth of the castle owners.

2.4 Conclusion

The function of the castle was to control the surrounding countryside and provided two primary roles during medieval warfare; an offensive and active role, and a defensive and passive role (France 1999, 78; Jones 1997, 164-5). The offensive role is to provide a staging ground to assault a neighbouring country or for a (counter) offensive against an invading army. The defensive role of the castle is to protect the castle lord or his vassals

against a besieging army (Purton 2010, 94). These two roles are provided by two factors; the garrison of the castles, primarily used during the active role of the castle, and the morphological features of the castle, primarily used during the defensive role of the castle. However, both functions cannot function with the absence of both factors.

The castle studied can be differentiated into three types of castles, the typology presented is based on the typology devised by H.L. Janssen (Janssen 1996), by order of size and wealth, starting with largest and wealthiest: square castles, castles, as the name states, with a square design built by the count and the high nobility (Janssen 1996, 238-244); keep tower, castles placed on an elevated island surrounded by a moat, and a second area, possibly as well surrounded by a moat, with agricultural structures, keep towers were built by the lower nobility (Janssen 1996, 85-7); and moated sites, mock castles, consisting of castle like structures with a moat and thin walls, max. 60 cm thick. Constructed by the lowest nobility to maintain their noble status (Janssen 1996, 96-105).

The nobility of Holland can be divided into three main classes, based on the research performed by A. Janse (Janse 2001), lowest to highest: *welgeborenen*, the lowest nobility, every member of the remaining classes are members of the *welgeborenen* as well; *ridderscap,* members of the *welgeborenen,* which are knighted; and as highest members of the nobility, *baanderheren* or *baron*, members of the *ridderscap* with an extra title, with the responsibility of maintain a military banner with 50 knights (Janse 2001, 81-6). These noble titles can be during the 13th and early 14th century approximately linked to constructor and castle lord of the three castle types; *Baanderheer* can be linked to square castles, *ridderscap* to tower keeps and *welgeborenen* to moated sites. However, during the 14th and 15th a discrepancy between rank and wealth of a castle owner, and castle type can arise.

The different ranks in the nobility of Holland had military obligations towards one another, as well as to the count, through the medieval feudal system. This obligation was induced by a bond between a lord and his vassal and meant mutual obligation towards one another. Hereby, the primary obligations of a vassal toward his lord was to service and to aid his lord with military service when called upon (Stephenson 1942, 22-32). These obligation could become layered. As a result, a large numbers could become involved into a conflict. These conflicts could occur among the nobility as well, called

kleinkrieg. However, were mainly fought between *baanderheren,* since they were powerful and wealthy enough to maintain a large army (Glaudemans 2004, 51).

3. Siege Methods and Development

Siege warfare, i.e. assaulting a castle, a town or other defensive structures, occurred in many forms during the medieval period with different techniques and methods, depending on the goal of the siege and the available resources to attacker and defender of the besieged structurer(s). A siege could be won by the besieging army in two ways; by surrender or complete analysation of the defenders. This could be achieved by several methods. In this chapter these different methods are described, along with the development of artillery used throughout the late middle ages.

3.1 Siege Methods

Different methods applied in siege warfare during the late middle ages utilized a wide range of different skills and weapons; hand to hand combat with ladders, siege engines protecting sappers destroying the walls, artillery destroying the structures and starvation (Porter 2000, 44-8; De Vos 1995, 18). These methods could be applied from different ranges. The effectiveness of these different methods transformed overtime and were susceptible to the technological developments. These different methods were used in conjunction with each other, to amplify the effectiveness of the siege in general.

After examining several chronicles and literature three different siege methods could be distinguished. As described in the introduction historical sources have their limitations examining specific methods used during sieges. Nevertheless, using multiple historical sources describing sieges can give an insight into the different methods available for a medieval commander to conquer a defensive structure. By using the siege methods described in historical sources as a theoretical framework it is possible to link and classify archaeological material into different siege methods. The siege methods:

Starvation

The first and the safest method of conquering a castle was to starve the defenders. Starvation was used to slowly deprive the defenders of their supplies and forcing them to surrender. It was the most common siege method deployed (DeVries 1995, 72; Rogers 1993, 246; Hebron 1997, 26). Even with the introduction of gunpowder and the evolution in firepower during the early half of the 15th century, starvation was the main cause for large castle to surrender (Rogers 1993, 265). Starvation could only be achieved by cutting off the supply lines of the defenders and preventing the defenders from gaining new aliments. Recognizing starvation in the archaeological record is almost

impossible, due to the large distance the blockades to the castle were placed, out of reach of the defending artillery.

Artillery Bombardment

The second method of conquering a castle was using artillery to destroy the defensive structure and killing the defenders of the castle, or destroy enemy defensive structures and artillery to enable a close combat assault (Payne-Gallwey 1995 (1906), 261). This was done by shooting large projectiles at the defending castle by various devices. An example is the siege of Dover in 1216, by Prince Louis of France. *Perriers* (trebuchet) and *mangonels* (catapults) were used to shoot a breach in the walls of the castle whereupon troops, utilized this breach to try to conquer the castle (Goodall 2000, 94).

Artillery had to be placed close enough to be operating in effective shooting range. However, this meant that the defenders could use their own devices to shoot at the attackers, trying to destroy the attacking siege engines. By destroying the attacker's sieges engines it was possible to gain control over the offensive power of the attacker and prevent them from destroying the defenders defensive structures. Therefore, the first priority for a besieger was to destroy the artillery of the defender (Purton 2010, 65). For instance, during the siege of the city of Zierikzee in Zeeland, both the besiegers and the defenders used trebuchets to attack the opposing artillery and during the siege of Harfleur, in 1415, Henry V ordered his artillery to be fired at the walls and fortifications of the defending enemy, instead of the buildings inside the town as was commonly done, to destroy the defending artillery (De Graaf 2004, 191-2; Rogers 1993, 262). Smaller projectiles were shot by hand and crossbows by both sides, to attempt to kill enemy combatants operating the siege engines and artillery. The effective operating range of both cross and hand bows is unknown. However, most sources estimate the range of the cross hand bow between 200 to 300 metres, well within the operating range of most medieval artillery devices (Payne-Gallway 1995 (1906), 22-3).

Using artillery can be recognised in the archaeological record with a larger amount of large bullets shot by artillery, and arrows shot by the attacking and defending archers.

Close combat assault

The last method used to conquer a castle is a full scale attack by combatants at the castle; a close combat assault. The goal of the attack was to capture or destroy key elements of the castle or to kill the defenders, and achieving control of the castle.

During the attack various siege engines were deployed, designed to protect the combatants, or overcome the defensive structures of the castle, such as walls and moats (De Vos 1995, 18; DeVries 1995, 72). Sappers were sometimes used to undermine the structure of the castles. However, the castles in the county of Holland were all defended by a moat, which deprived the usages of mining (Purton 2010, 81).

The full scale attack was done undercover of missiles shot at the defenders. The defenders would try to defend the castle by shooting their own projectiles at the attackers. From an archaeological perspective the full scale assault creates a situation whereby the change of losing objects used in hand to hand combat and projectiles used to kill enemy combatants is higher.

3.2 Development of artillery in siege warfare

During the late medieval period a large array of various military technological developments had an impact on siege methods deployed. Leading in this military development is the progress in increasing firepower of the artillery deployed. The development in armour, hand arms and polearms play, in the greater development of siege warfare, a minor role. Therefore, the development of siege warfare is linked to the development of artillery. Three different periods can be recognized during the 13th, 14th and 15th century.

Pre-gunpowder (ca. 1200-1340)

During the pre-gunpowder period artillery used the storing and release of energy to accelerate and shoot projectiles. These various ways of accelerating objects were reflected in the three mainly used artillery devices: trebuchet, ballista and springalds. The trebuchet utilized the storing of gravitational energy, by employing rotating beams and large counterweights, to launch its projectiles (Tarver 1995, 136). The trebuchet consisted out of a vertical arm with on top a joint allowing a circular motion. On top of the joint a horizontal wooden arm was secured with on one side a large weight, and on the other side a net, wherefrom the projectile was launched. By moving the weight up and releasing it the net was accelerated and with it the projectile which was shot at the target (see figure 2.1) (Waale 1990a, 155). Trebuchet shot projectiles, depending on the size of the trebuchet, between 50 and 250 kg over a distance of 200 to 300 m (De Graaf 2004, 49). The projectile shot by a trebuchet could vary in shape.

The springald is a device which utilized the storing of energy in torsion and releasing this energy to shoot projectiles. The tension was generated by twisted skeins of rope, or other material, placed in a wooden frame with bow arms placed within the skeins. A string was attached between the bow arms and by pulling back and releasing the string a projectile could be shot (Purton 2010, 397). A ballista used not skeins to store energy, but one or two wooden bows with a string attached between them; a ballista worked as a gigantic crossbow (see figure2.1)(De Graaf 2004, 51). Both the springald and the ballistae shot large bolts named *quareels* within a range of 180 to 200 m. These bolts could penetrate most armours and were an effective anti-personnel, as well, an anti-artillery weapon. (Purton 2010, 88).

Both trebuchets, springalds and ballistae were used by the attacking side, while the defending side only deployed springalds and ballistae. The space needed to operate a trebuchets effectively was not available within the castle's walls. Springalds and ballistae were not very effective against trebuchets, because the trebuchet operated outside the effective range of the springalds or ballistae (Purton 2010, 399).

(Figure 2.1: Showing the use of a ballista and a trebuchet in a 14th century Alexander Roman c. 1340, MS Bodl 264 f.201r)

Early use firearms (ca. 1340-1400)

The biggest development in medieval warfare was learning to harness the power of gunpowder to launch projectiles (Porter 2010, 55-8). Firearms were introduced for the first time in Europe during the first half of the 14th century. However, firearms became only in extensively use from the 1370 within siege warfare in the county of Holland (Bult 2000, 32). Gunpowder did not have the suspected instant success; firearms had the power to shoot through even the most powerful armours, however, firearms were very inaccurate, had a high chance of exploding when fired and had to be brought close to their target because of their inherent inaccuracy (Purton 2010 66; 272; Keen 1999, 277). In the beginning guns did not have more firepower than the older forms of artillery. The

earliest guns were used to destroy houses and not to destroy walls during a siege and were therefore not heavely deployed during castle sieges (Rogers 1993, 258). However, they were cheaper to purchase than traditional forms of artillery, although they were more expensive to handle, with the acquiring of gunpowder. Guns grew quickly during the 14th century in popularity because of the cost effectiveness and the psychological impact the weapons had, by producing frightening sounds (Rogers 1993, 59). Up to the end of the 14th and the beginning of the 15th century firearms were used alongside earlier forms of siege engines (see figure 2.2) (Purton 2010, 173).

Two experiments with replicas have gather data on the range of cannons. The first experimented used a replica of the loshult gun, based on the first imagery of an European firearm, and managed to achieve ranges with lead balls up to 1.200 metres and using *quareels* up to a distance of 500 metres. However, the accuracy of both shot was poor and estimated was that a target could only be effectively hit on a distance of 200 metres. Both the *quareel* and lead ball could penetrate a mail shirt, although not full plate armour. The second experiment used a replica of a gun illustrated in the Milimete manuscript, consisting of a gun of 900 millimetre long, 410 kilogram heavy and with a borehole of 38 mm. The team performing the experiment managed to shoot a *quareel* of 1350 mm in length over a distance between 135 and 180 metres. Both experiments consisted of a large amount assumptions to make their experiments work. For example, the precise dimensions of the cannons and the composition of the gunpowder. Nevertheless, the experiments give insight into the potential range of early medieval gunnery (Purton 2010, 117-8)

(Figure 2.2: The use of a cannon alongside with a trebuchet in an early 15th century Alexander Roman, c. 1400, MS Bodl 264 f.255r)

Gigantism in gun warfare (ca.1400-1450)

During the 15th century a large part of the inherent problems with the earliest firearms were resolved and the influence of firearms on medieval warfare had grown. One of the developments that resolved a large part of the problems with the earliest firearms was the increase in iron work technology. As a result of technological development, it was possible to make sturdier firearms, which could withstand more powerful blasts and made the cannons safer in their deployment (Purton 2010, 174).

The increase in iron work technology also made it possible to produce larger guns (Purton 2010, 174). The earliest cannons were relatively small, but during the period of 1370-1430 cannons grew considerably in size. In the northern Netherlands in the beginning of the 15th century three types of cannons could be distinguished: Smaller hand cannons, named *loodbussen,* which fired lead projectiles with a cylindrical shape with a diameter between 30 mm to 60 mm, or fired a *quareel*. From a city bill of the city of Zwolle, in the eastern part of the Netherlands, a *pijlenstoel* belonged to every *loodbus* with 106 arrows (Waale 1990a, 179). Furthermore, light *steenbussen* firing stone bullets

with a diameter between 120 and 200 mm, heavy *steenbussen* firing bullets with a diameter between 250 to 450 mm and as the last type, the heaviest of all the cannons, the bombardment, firing bullets up to 800 mm weighing more than 150 kg (Waale 1992, 305).For example, in 1379 the count of Holland purchased in 400-pound stones for his large cannons called *groote dunrebussen* (Rogers 1993, 260).

This love for ever getting bigger cannons came out of the need to show off by the nobility; cannons became a status object for the ruling elite (Purton 2010, 214). These colossal guns were named in the 14th and 15th century, becoming their own personalities (Keen 1999, 275)(see figure 2.3). However, the problem with these massive guns was the logistics. These large guns were a logistic nightmare to transfer from one location to another (Purton 2010, 214). They had to be transferred with up to 18 oxen and it was not a rare sight to construct a complete new bridges or roads to transfer the guns. By the mid-fifteenth century the fashion for gigantisms ended, other, better, ways were found to achieve the same result (Keen 1999, 276).

(Figure 2.3: Large bombardment called the Pumhart von Steyr, early 15h century (www.the coolist.com))

Just as in the pre-gunpowder artillery period not all the artillery available could be used from within the castle. Attackers could use the full range of different guns, but defenders could not use the colossal guns. Using guns within in towers or walls of castle made it necessary to make changes to the design of castles. The smoke generate during firing firearms had to escape and there had to be room for the recoil of gun after firing.

In addition, sight holes in towers had to be adjusted to the use of firearms. Larger sight holes in towers meant weak spots in the castle structure (Purton 2010, 270). The larger the gun the more smoke and recoil was generated after firing the gun, needing more design adjustments to the castle before firing the gun was possible. The advantages of using colossal guns did not outweigh the disadvantages of using the guns within castles contexts. Therefore, smaller guns with barrel diameters of 10 to 20 mm were extensively deployed by defenders, alongside the *loodbussen.* These guns were used to shoot at enemy troops or siege engines and were able to shot at the enemy at the same range of the attacking artillery (Purton 2010, 175). However, Jan van Arkel used two large bombards during the siege of Hagestein in 1405 (Waale 1991, 338).

After 1450 a larger differentiation in guns sizes became available, with a decrease of the utilizations of colossal guns and an increase in the use of handguns, as a result of the improvements made into fire power (Keen 1999, 280). By 1440 firearms were the only siege engines used to shoot large projectiles, fully replacing the old trebuchets. However, ballistae were still used to shoot *quareels* (Purton 2010, 269). From the mid-15th the arquebus became more and more in use, solving problems the earlier handguns had. The arquebus was a metal tube placed on a wooden handle and could be fired from the shoulder (Keen 1999, 280). By 1470 cast-iron bullets were commonly used as projectiles in firearms, increasing the firepower and destructive power of firearms (Smith and Devries 2005, 47). This development in increasingly higher firepower meant that during the end of the 15th and 16th century completely new structures were designed to withstand sieges and old fashioned castles used its military relevance (Janssen 1996, 125).

3.3 Conclusion

Siege ware was one of the major components of warfare during the late middle ages. The different siege methods deployed can be grouped into three main methods for besieging; (1) conquering a castle by starving the defenders of the castle, (2) shoot the defenders into submission or completely destroy the defensive structures, to enable a close combat assault of the castle by utilizing artillery, (3) deploying a full scale assault of combatants; the goal of the attack was to destroy or capture key elements of the castle.

The primary development of siege warfare, was the development of artillery, which had the greatest impact on the deployment of the different applied sieging methods. The

evolution of artillery used within siege warfare can be divided circa into three periods; (1) during the pre-gunpowder period (1200-1340) trebuchets were used to launch projectiles to damage the defensive structures of the castle, while springalds and ballista's were used to shoot *quareels* to kill enemy combatants and destroy assaulting artillery (Purton 2010, 88). (2) Early use firearms: In 1340 the first firearms were developed and after 1370 firearms were extensively used in the county of Holland (Bult 2000, 32). These firearms did not have the suspected instant success and the old forms of artillery were still used in conjunction with the newer firearms. During the last quarter of the 14th century firearms became increasingly popular (Rogers 1993, 59). (3) Gigantism in gun warfare: during the period 1370-1430 an emphasize on ever growing larger firearms was placed. The production of these large firearms was possible as a result of the increase in the ironwork technology (Purton 2010, 174). These cannons were capable of firing projectiles up to 200 kg (Rogers 1993, 260). It was not possible to fire these gigantic guns from within castles. Therefore, smaller guns, with barrel diameters of 10 to 20 mm, were extensively used by defenders to destroy enemy artillery (Purton 2010, 175). After 1450, there was a decrease of the utilizations of colossal guns and an emphasize of a larger amount of differentiation in cannon size. During this period firepower of artillery increases to levels whereby traditional castles could not withstand artillery attacks any longer, and new forms of defensive structures need to be devised (Janssen 1996, 125).

4. Military material

Differentiating between besieged and non-besieged castles using military objects is based on the assumption of a difference in deposition probability for military objects occurred during a siege compared to a non-military, i.e. peace, use period of the castle. To be able to adequately study these military objects a definition should be present to determine the specific features and attributes of these objects. However, determining the military function of archaeological objects within late medieval society, composes of several complications. These complication are derived from establishing the military function of archaeological objects by the specific shape and dimensions of an object. The two main complexities are: (1) differentiate between tools, hunting equipment, and military objects; for example, differentiating between arrows designed for hunting animals and arrows designed for war (Sensfelder 2007, 267-96; Jessop 1996 192-205). (2) Furthermore, distinguishing between the civil and military use of weapons. For instance, during the late medieval period it was common practise to demand satisfaction for loss by claiming reconciliation by dint of an honour killing (Glaudemans 2004, 68-71). These honour killings were performed in a civil context using disparate weapons commonly used in war (Glaudemans 2004, 112-3). Considering the complications for defining military objects the following definition for late medieval military objects has been used in this thesis:

Material culture indicating military action occurring at a castle. These are objects with the primary function to maim or kill individuals in battle or to protect individuals versus these devices, or material culture specifically designed to destroy military structures.

Within this thesis only object that were designed to kill, maim or defend an individual were considered as military material, and not badges, stirrups or other objects that do not have military action as their primary function. Because these objects do not in first instance describe the military action of warfare, but describe the social aspects of warfare, or were supportive equipment (Jones 2010, 57-69).

The structure of this chapter is as followed: first the different dating methods for military objects within a castle context are briefly discussed, with an emphasis on the dating of military objects using typologies. Than the categorisation of the military objects, into categories and subcategories, is discoursed. At last, general site formation

processes are briefly confabulated, along with the implication of site formation processes on the deposition of the categories and subcategories of military objects, introducing a theoretical framework for the expected deposited military objects during a siege.

4.1 Categorization and dating of the military material culture

The military objects studied in this thesis are composed of a large array of different objects ranging in size, material and function. To be able to compare the composition of these objects between castles, the dating of the objects and the site formation processes for the different objects type should be apprehended. To enable the comparing of different objects, a division into categories and subcategories has been made. This division has been made according to the difference in use, difference in site formation processes for the different objects and wear-ability. The wear-ability is defined as the method and simplicity how an objects is handled and worn in and outside combat. The wear-ability has effect on the site formation processes.

The four main categories are: polearm, hand arm, projectiles and armour. A subdivision has been made for the categories of hand-arm and projectile, because different dating methods for the subcategory has been used. These categories do not include all possible categories described by the definition of military material defined in the introduction of this chapter, since the studied items did not include all materials described.

Because dating the military material is essential to link the examined material with the possible sieges occurring at the studied castle, it is of essence to understand the dating techniques and their limitations. However, discussing archaeological dating techniques in depth is beyond the scope of this thesis. Nevertheless, the two main dating techniques for the military material examined are discussed.

In total three dating methods can be characterized in archaeology; absolute dating methods, context dating methods and relative or typological dating methods (Aitken 1990, 1-6; Bahn and Renfrew 1991, 117-70; Gowlet 2008, 197-205; O'Brien and Lyman 2002). No absolute dating methods have been performed on one of artefacts. Therefore, absolute dating methods are not discussed.

Context dating is based on the dating of an archaeological context by dating the context with guide fossils. Within medieval archaeology either absolute dated objects or pottery are mainly used as guide fossils. However, most military objects are expected to be deposited in the moat of the castle and dating military objects deposited in moats using context dating is limited to the construction and filling of the moat, which is mostly equal to the construction and destruction of the castle. The moat of a castle forms a palimpsests, with the deposition of objects from several periods on the bottom of the moat (Bailey 2007, 10). Therefore, if it is not possible to date the excavated military objects using typologies, the material is dated to the use of the moat, or castle.

Typology dating is based upon two main principles: the first principle is based upon the development of and the retention of older design choices left in artefact design. The second principle is based on the dating of similar objects within the same artefact type and using these artefacts as an analogy to date other objects (Bahn and Renfrew 1991, 120-3; O'Brien and Lyman 2002, 23-58). These typology can form complete schemes with regional or local variation. However, for late medieval military material only a few typologies exist; only for the categories of hand-arm, both sword and daggers, and armour (Oakeshott 1991; Seitz 1981; Blair 1958; Goll 2014). For the remaining categories no complete typologies exist to date the objects, or the typologies only date local and regional variations of material, with no use for the materials studied. The dating of the various military objects is presented in the catalogue accompanying this thesis.

Polearm

Polearms are weapons placed on the end of a wooden shaft and were the backbone of the medieval army, used by cavalry and infantry alike. The shaft of these weapons can vary between the lengths of 1.5 metre, for smaller pole-axes, and up to 5 metres for pikes. The heads used by different polearms varies from small spearheads to larger axe heads, with a specialisation of the shape different heads used (Waldman 2005, 1-6). The general assumption can be made that smaller polearm heads were placed upon longer shaft, and were used for a more thrusting oriented fighting style, while heavier poleaxes are placed on studier shorter staffs, and were used in a more slashing based fighting style (Waldman 2005, 17-21; Snook 1979, 3-5). There is no typology made for dating polearms. The books *Hafted weapons in medieval and renaissance Europe* by Waldman and *Medieval catalogue* by Ward, both describe roughly the development of the

different polearms (Waldman 2005; Ward 1940). However, it is impossible to date specific forms of polearms with both typologies and therefore they are not useable in this thesis.

Hand arm

Hand arms are weapons which were used in hand to hand combat, they consist of swords, daggers, axes, maces and other one- and two-handed close combat weapons. The differentiation between polearms and hand-arms is derived from the range where both weapons were operated in, where polearms are placed upon a wooden shaft and are used at a considerable range, hand-arms consist of one- and two-handed weapons used at closer range, and are mainly worn as a secondary weapon (Waldman 2005, 10-16; Puype and Stevens 2010, 94-6; 240-3).

A subcategory for the hand-arms studied is defined into daggers and swords. This differentiation is based upon the difference in size, dating typologies and social status allowing to wear the weapons. The right to wear swords was exclusive to a small part of the late medieval society including members of the *ridderscap*, while the rights to wear a dagger was ubiquitous, on condition that the size of the dagger was allowed to be worn in public (Glaudemans 2004, 113).

Sword

The sword is the most known weapon of the late-medieval period, it is the symbol of the noble knight (Oakeshott 1991, 18). There are several typologies for dating and assemble sword groups (Bruhn Holffmeyer 1963; Seitz 1981; Oakeshott 1991). However, within this thesis the sword typology designed by Edward Oakeshott is used for dating swords, because of the high amount of sword types described and precise dating of the weapons (Oakeshott 1991). The two main features for dating the sword are: (1) the shape of the blade in conjunction with the shape of the section of the blade, (2) and the style of pommel, grip and guard Oakeshott 1991, 2-3).

Dagger

Daggers are knife-like objects used in very close combat. The distinction between a dagger and knife is based on the function of the object; at a knife is designed to be used as a tool, while a dagger is designed to be a weapon. The two main distinction between the design of a dagger and a knife are in the shape of the blade. A knife has by definition a one sided cutting blade while daggers can have a two sided cutting blade, as well as a one sided cutting blade (Puype and Stevens 2010, 157). The distinction between a one sided cutting blade of a dagger and the one sided cutting blade of a knife is the width, thickness and shape of the blade. The blade of a dagger is narrower, thicker and more pointer. Clearly designed to be used as a thrusting device, designed to be used to thrust through armour and not for processing materials, such as the wider less pointer design of knives. In several towns in the Low Countries blades on daggers and knives had to be wider than a specific ring to prove the object was not designed to be merely used in combat.

Daggers were extensively worn in civil contexts (Glaudemans 2004, 112; Puype and Stevens 2010, 96). However, it is impossible to differentiate between the difference in military and civil use of daggers from an archaeological context. Conclusion based on the presence of daggers in a castle archaeological context in relation to siege warfare are thus complicated. For dating the daggers examined the typology devised by H. Seitz is used (Seitz 1981).

Projectile

Projectiles are objects that are designed to be accelerated through a mechanism and cause damage on impact. The impact a projectile had is determined by the dimension and configuration of the project in conjunction with the acceleration speed of the object, while the dimension and configuration of a projectile is determined by the shooting mechanism. A large array of shooting mechanism were in use during the late medieval period, with the most common types of mechanism: bows, crossbows, springald, ballistae, trebuchet and firearms. The development of the artillery in use during this period is described in chapter 3.

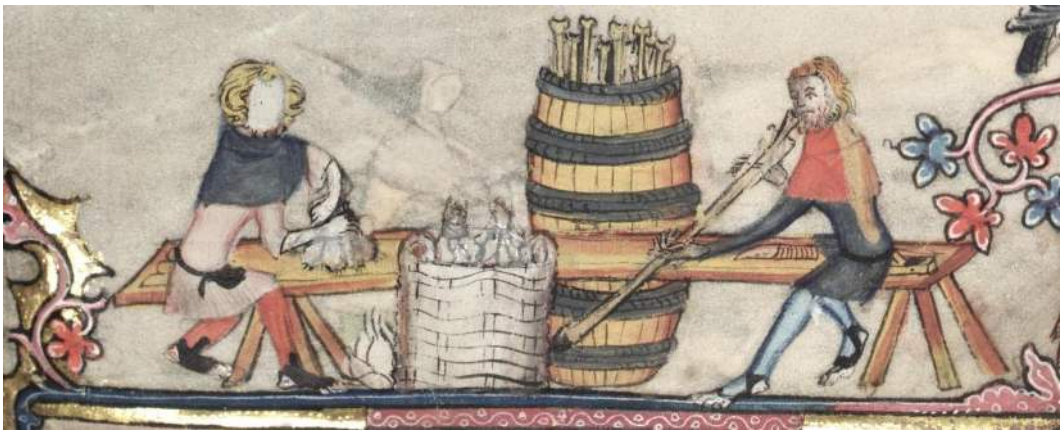
Projectiles are divided into two subtypes: bullet and arrow-projectiles. The division has been made according to the difference in materials both subtypes comprised of, and the difference in shape of both subtypes.

Arrow-projectiles.

Arrow-projectiles are projectiles that consist of a shaft with an attached head and stabilisers. The shaft is mostly consisted of wood and the head out of iron. The stabilisers could be made of a large array of different materials. The three materials mostly used were; feathers, wooden stabilisers and copper-alloy stabilizers (Puype and Stevens 2010, 354; Smith and Devries 2005, 47).

Nearly all shooting mechanism could shoot arrows, with the exception of trebuchets. Each mechanism had to use an arrow design adjusted to the firing mechanism. The size and shape of the shaft and the stabilizers are the main difference between the arrows-projectiles. However, the material both the shaft and stabilizers primarily composed of, feathers and wood, are susceptible for taphanomic processes in the ground, only two arrow shafts are presented in the studied dataset (Schiffer 1996, 151; 165-179). Arrowheads are less susceptible for taphanomic processes in the ground and are, therefore, the most found attribute of arrow-projectiles during excavation. Nevertheless, the arrowhead is the hardest attribute to distinguish between arrow types, because various types of arrowheads are both used on different arrow-projectiles (Sensfelder 2007, 267-96). As a result, it is complex to distinguish between the differences in arrow types within an archaeological context.

Conversely, it is possible to distinguishing between two main types of arrow projectile within the archaeological record, because of the difference in socket size of both arrow-projectiles. *Quareels* were large arrow-projectiles shot by artillery and could be over a meter long (see figure 3.1). Consequently, they had a larger arrowhead than their smaller counterpart, arrows and bolts shot by cross and hand bows. Two complete *quareels* are found at the castle Huis te Merwede near the city of Dordrecht. However, it is impossible to determine if the objects were shot by firearms or torsion artillery.



(Figure 3.1: The size of quareels in a manuscript c. 1340, MS Bodl 264 f.123v)

No typologies are available for dating arrows or arrowheads in the Low Countries. The most used topology for dating arrowheads is made by Jessop in *A new artefact typology for the study of medieval arrowheads* (Jessop 1996). However, this typology has not been used to date arrowheads in this thesis for two reasons: the typology made by Jessop is mainly based on arrowheads excavated in England, while there is a large regional variety in designs of arrowheads and their dating (Halpin 1997). The second reason is the dating of the different types of artefacts is not precise enough to be used within timespan examined in this thesis, the dating of the arrowheads has a maximum exactitude of one or two centuries (Jessop 1996).

Hence, no typologies exist to accurately date arrowheads. However, arrowheads form the major category of objects studied. A differentiation into three arrowhead types has been made to approximately date the arrows. This differentiation is based on the general shape of the arrowhead, which can be related to armour the arrowhead was designed to pierce. Therefore, it is possible to link the dating of arrow-projectiles to the dating of armour. General speaking the slimmer and pointier an arrowhead is, the better it pierces cloth and mail (Jones 2014, 70). While, more flattened points were designed to penetrate plate armour, since these arrowheads do not bent on impact (Jessop 1997, 48). However, several styles of armour were worn during the same time period (Goll 209, 225), so several designs of arrowheads would have been in use during the same period. Therefore, to date the different type of arrowheads not the single arrowheads will be dated, but the composition of an assembly of arrowheads from the same archaeological context.

The arrow types were defined by looking at the general shape of the arrow and not by considering the dimension of the arrows (see figure 3.2). After dividing the arrows in types the known socket diameters were combined with the arrow types, to make conclusions on the devises shooting the arrows.

The following arrowhead types could be defined:

Arrow type 1: a long, tender and pointed arrowhead type. It is relatively flat and can have sharp edges. The point starts near the socket of the arrow.

Arrow type 2: a short and wide arrowhead type, with a small and short point. In the section the arrowhead has the shape of a rhombus. From the socket of the arrow the arrowhead start to widen and quickly, near the end of arrowhead, forms a point.

Arrow type 3: can be best described as a diamond shape. From the socket of the arrowhead the arrowhead start to widen in width and thickness, and in the middle of the arrowhead starts to from a point again. All studied type 3 arrowheads have socket diameters larger than 18 mm. Therefore, type 3 arrowheads were used on *quareels,* possibly shot by ballistae, springalls or *loodbussen.*
The remaining arrowheads cannot be placed within one of the three types of arrowheads, but are not similar enough with one another to form extra types.

(Figure 3.2: The three different arrowheads types defined in this thesis)

From a functional approach type 1 arrowheads are designed to pierce cloth and mail, the type of armour that is mainly worn during the 13th and first half of the 14th century, and is gradually replaced by plate armour (Blair 1958, 53-76). However, a problem occurs with the so called *jacke* or *scope*. These were thick padded jackets worn on top of armour during the latter part of the 14th and into the early 15th century (Kelly 2013, 153). The usage of the *jacke* or *scope* is unknown, argued is that the padded jackets were used as extra protection against arrows or pikes, or a way to shows wealth by adding another

layer of expensive cloth on top of the armour (see figure 3.3). Type 1 arrowhead would have used to pierce the padded jacket, but not the armour underneath the jacket. Type 1 arrowheads would have been primarily used during the 13th, 14th and decline in use into the early 15th century.

(Figure 3.3: The jacke of Charles VI dated to 1400 (Kelly 2013, 154))

Type 2 arrowheads, with their flattened point, were designed to pierce plate armour. Presumably, dating post- 1300/1350 after the introduction of full plate armour (Blair 1958, 53). Both type 1 and type 2 arrowhead have a socket diameter between 6 and 12 mm, concluding that both types were shot by either cross or hand bows.

The development of the composition of type 1 and 2 arrowheads during the 13th, 14th and 15th century is as followed: during the 13th and early 14th century type 1 arrowheads would have been the dominated arrowhead type in use, during the 14th century type 1 arrowheads were gradually partly replaced by type 2 arrowheads to counter the development of plate armour. Nevertheless, type 1 arrowhead was not fully replaced, even during the late 15th century, the high days for plate armour, part of the soldiers are still wearing mail and cloth as their main armour (Blair 1958; Goll 2009, 40-42). Thus, type 1 arrowheads are still expect in a late 15th century context, but not in the same large numbers as during the 13th and 14th century.

Type 3 arrowheads, with their large size and weight, were shot from a large devices, i.e. artillery, and could easily penetrate most armours, destroy most enemy siege engines and may penetrate enemy siege structures (Purton 2010, 88). Q*uareels* were in use

during the 13th, 14th and 15th, with ballistae still in use during the end of the 15th century (Purton 2010, 269).

However, type 3 arrowheads can as well be interpreted as polearms. For example, a detail on the painting *Lams Gods* of Van Eyck dated to 1432-33 shows a knight carrying a lance with a type 3 arrowhead polearm head(see figure 3.4). The main difference between a *quareel* and a polearm is the thickness of the shaft; a polearm has a thicker shaft than a *quareel*. However, as shown earlier, shafts are prone to taphonomic processes and shafts of polearms can be tapered to fit a smaller pole weapon-head, this can be seen as well on the painting of van Eyck on the right polearm, increasing the problems for differentiation between polearms and *quareels*. The amount of type 3 arrowheads excavated combined with the probability of losing specific categories of object can give insight in the differentiation between polearm and arrowhead; larger amounts of type 3 arrowheads point towards the use of objects as arrowhead, and not polearm head.

(Figure 3.4: Showing type 3 arrowheads being used on lances at painting of van Eyk, Lambs Godt)

Bullet

Bullets are solid projectiles with either a round or rectangular shape, shots from firearms or thrown by siege engines. Bullets came in several different sizes and figurations. As stated earlier the size and weight of the bullet depends on the machine shooting the bullet. Bullets could be made of stone or metal. Stone bullets are the most common bullets used with firearms and siege engines during the late middle ages and

were in used up to the 17th century (Smith 2002, 450). Because most bullets are round and have no distinguished shape to type them by and few bullet are found in a datable contexts, it is impossible to date most examined bullets. However, it is possible to determine the size of the firearm firing the bullet by measuring the diameter of the bullet which can be related to the size of the diameter of the firearm. The diameter of the firearm is always relatively larger than the diameter of the bullet to be able to secure the bullet in place in the barrel of the cannon (Waale 1992, 305).

Distinguishing between a trebuchet-bullet and a cannon bullet can be complex. When a bullet has a rectangular shape it is incontestably a trebuchet bullet, because the rectangular shape cannot be fired from a round cannon barrel. The problem arises when the bullet has a round shape, because it can be shot or fired from both devices. The dating of the object can only be done by context dating. If the bullet can be dated pre-1370 it is a trebuchet bullet, because large firearms were not in use prior to 1370 (Bult 2000, 32). If the bullet is dated after 1370 the bullet could be shot by either a trebuchet or a large bombardment, provided that the projectile is of sufficient size to be shot by either a trebuchet or bombardment.

Armour

Armour is specific clothing designed to protect the wearer against damage inflicted by an opponent and his weapon. Armour is worn and not carried as weapons. Armour can be made from a large array of materials, but the most common materials used during the Middle Ages are cloth, leather and iron (Blair 1958; Goll 2009).Discussing the complete evolution and developments of armour is beyond the scope of thesis, however the development of armour can be described as follow. The development of armour is a gradual evolution from mail focussed armour, in the 13th century, to a complete full plate armour in the 15th century, with the introduction of plate armour in the first half of the 14th century (Blair 1958, 53-76; Goll 2009).

4.2 The site formation processes for military material culture

In order to use military objects excavated at castles as to determine if a castle was besieged or not, it is hence necessary to determine the link between the archaeological record and human activity, and learn the effect siege warfare had on forming of the archaeological record. It is imperative to know the forming of the archaeological record to determine the boundaries of the data that can be obtained from the archaeological

record from the various castle sites (Schiffer 1976, 28). Therefore, a general understanding of site formation processes for the late medieval period is seminal, apprehending the specific function of military objects during the late medieval period, and the inherent difference in deposition probability between the different military categories.

4.2.1 Site formation processes

The forming of the archaeological record occurs in three steps: deposition, taphanomy and excavation (Schiffer 1996, 3-12; Bahn and Renfrew 1991, 49-116). The difference in military objects surviving in the archaeological record between besieged and non-besieged castles occurred during the deposition of the objects, and does not occur in difference in taphanomic processes or in excavation techniques and intensity. Therefore, only the difference in deposition of the objects is discussed.

The deposition of artefacts into the archaeological record can be divided in three categories: discard, loss and ritualistic deposition (Schiffer 1996, 28). There are no known depositions of military objects within the Christian context of the late medieval castle with a religious context. However, there are two ritual or social events occurring at castle in the late medieval period during or after warfare that possibly can influence the deposition of military objects; the destruction or dismantling of the castle.

Discard is the deliberate deposition of an artefact when the artefacts can no longer perform their techno-function. These objects are discarded when: (1) there is a transfigure in the object, (2) the mechanical effectiveness of the objects is reduced through breakage, (3) there is use-wear or deterioration on the object, (4) or still-serviceable objects can be discarded when they are part of a larger entity which fails (Schiffer 1996, 48-9).

According to Fehon and Scholt “Loss can be defined as the unintended dissociation of an object from its user” (Fehon and Scholtz 1978, 271). The deposition of artefacts through loss can be divided into two probabilities: the probability of losing an object and the probability of recovering the object. This can be calculated according to the next formula (Fehon and Scholtz 1978, 271).

P(N,L) = P(N/L)* P(L)

Where:

P(N,L) = probability that an object will be lost and not recovered

P(N/L) = probability that an object is not recovered, given that it is lost

P(L) = probability that an object is lost.

Indubitable the probability of losing or recovering an object is diverse in disparate situations. However, there is an inherent difference in the probability of losing certain objects versus other objects (Fehon and Scholtz 1978, 271). This inherent difference can be explained by the use and wear-ability of an object. The probability of recovering an object is further determined by the context where the objects is lost in and the replacement cost of the object. The higher the replacement cost the more energy is spent in recovering the object (Schiffer 1996, 78).

Because artefacts can be lost and recovered again a system of exchange is in place. Artefacts in use can be defined as in the system, while artefacts that are deposited are part of the archaeological record. Therefore, it is probable that objects have exchanged between the archaeological record and the system repeatedly (Schiffer 1996, 27-35). This exchange between the system and the archaeological record is seminal for understanding site formation processes for military objects, especially for artillery bullets.

The lost category is ritual deposition, as stated earlier there are no known religious deposition of weapons. However, there are two circumstances whereby a castle could be destroyed and possibly the deposition of complete objects happens: the dismantling of a castle prior before a siege or the destruction of a castle, possible after a lost siege, as a punishment. The dismantling of a castle falls within the military strategy of scorched earth, whereby assets that can provide a tactical advantage to the enemy is destroyed. During the conflict between Holland and Zeeland with Flanders in 1304, the troops of Zierikzee had already destroyed the castle Blodenburg, to prevent the Flemish of capturing and using the castle (De Graaf 2004, 184). The same tactic was applied by the prince of Orange in 1573-4. He ordered the destruction of a large amount of castles to prevent the Spanish from using them (Renaud 1955, 126). Castles could as well be destroyed as punishment for their castle lord, inflicting economic damage as well as

damage to the status and honour of lord (Janse 2009, 123). The dismantling of the castle was done by their own troops, while the destruction of castles as punishment was done by enemy troops.

4.2.2 Site formation processes of military material at castles

It is impossible to calculate the loss and recovery rate, and the probability of discard for military objects at castles. However, it is possible to determine relative probabilities of loss and recovery, and discard between the different categories of military material during a siege and peacetime. Consequently, a theoretical framework has been designed prognosticating the difference in military material deposited between besieged and non-besieged castles. This theoretical framework will be assayed using the military objects excavated at the studied castles

Shared between both deliberated deposition and loss of an artefact is the location where an artefact possibly becomes part of the archaeological record and can be linked from an archaeological perspective to the castle. For discarding objects this means a location whereby the artefact is not effectively removed from the system after deposition, and for loss to occur this means a location whereby the object cannot be easily recovered. Therefore, within the context of castles in Holland the moat and the surrounding countryside are the only true areas where an object can be lost and not recovered. The rest of the castles exist of structures wherein the recovery rate of objects is high. Moats at castles sites in Holland have marsh likely conditions making it hard to spot objects in the moat and increasing the cost of recovering objects from the moat, therefore for only the most valuable objects a recovery operations would be commenced (Bult 2001, 77). The locations were discard could occur at castle sites were limited. Moats were, as well, often used to discard objects (Bult 2001, 83). The other main location were military objects could be deposited in castles were cesspits located in the castle. However, the loss of military objects in a cesspit during a siege is minimised and will therefore not be discussed in this thesis. As a result, the designed theoretical framework focusses on the deposition of objects in the moat of the castle.

Discard

Determining the discard of military objects at a castle during peace or a siege is complicated, because the deposition depends on complex variables. Seminal is to realise that the amount of objects deposition would be rather low, because of the inherent high production and replacement cost of the objects, low use of the objects, mostly only during conflicts and, therefore, the intrinsic lower chance of breaking the object. The expected deposition of military object through deliberated deposition would be a rather low amount of objects with a (quasi-)random distribution among the different categories of military equipment. This expected random distribution is based on many, almost, undetectable processes, from an archaeological context, and circumstances occurring at a micro level at the various castles.

Loss of objects

As stated earlier the difference in loss of military objects at castles between a peaceful situation and a siege is one of the main expected difference to be able to determine if a castle was besieged by examining the archaeological record. This expected major difference between military material at besieged and non-besieged castles, within the archaeological record, is rendered by the increase of the loss rates of military objects through the frequent use of military objects during a siege.

The loss of military objects during a peaceful situation, i.e. no siege occurring at the time at the castle, is expected to be minimised, due to the low use and wearing of military objects, with the exception of hands arms which could be worn in civil contexts (Glaudemans 2004, 112; Puype and Stevens 2010, 96). The general rules of loss applies as well to military objects, whereby smaller objects have a tendency of being lost more often and harder to recover, because of their inherent nature to be harder to espy on terrain (Schiffer 1996, 77-8). Applied to the categories of military material this means that arrow-projectiles have a higher tendency to be lost. Therefore, similar as discard, the expected deposition of military objects as a result of the loss of objects during peacetime is expected to be low with a (quasi)-random distribution among the different categories of military objects, with a heightened probability of hand-arms and arrow projectiles to be lost.

However, during a siege military objects do have an expected significant increase in probability to be lost, due to high amount of use and wear of military objects.

Furthermore, there is a large expected difference in probability of loss between the different military material categories, as a result of difference in the use of the different categories. This difference in use of the different military material categories can be coupled to the different siege techniques applied during the late middle ages (explained in chapter 3). The probabilities for the loss and recovery of military objects are impossible to be calculated precisely. Nevertheless, it is possible to determine a relative ranking amid the military material categories, to propose a theoretical framework wherein it possible to make interpretation about the excavated military at the examined castles. Within this theoretical framework it is possible to conjoin the probability of losing military objects with the different siege techniques applied, and as well draw conclusions on siege techniques utilized at the various castles.

Of all the categories projectiles have relatively the highest probability of being lost. Projectiles are shot at an enemy, and during the flight can change directions or the projectile is miss aimed, causing the projectile to miss its initially target. As a result of the large distance projectiles are shot over it is not always possible to determine the precise location where the projectile landed, increasing the odds for the projectile to be lost. Due to, the nature of projectiles to have a possibility to miss their initially target in the castle, it is not uncommon for arrows to become part of the archaeological record in the moat of the castle.

There is a disparity among the amount of bullets and arrow-projectiles shot at castles during a siege, and a disparity between the recovery of bullets and arrow-projectiles. The disparity in amount of projectiles is caused by the difference of fire rate and quantity between the devices shooting arrow-projectiles and bullets, respectively hand and crossbows, ballistae, springalds and small fire arms compared to large artillery, i.e. trebuchets and bombardments. The arrow projectiles could be shot faster compared to the heavy artillery, with large bombard only be able to shoot twice a day, while small arrow-projectiles could be shot at a much higher, with multiple arrows a minute (Bartlett 1995, 21-2; Waale 1992, 305). The disparity between the recovery rate of bullets and arrow-projectiles is caused by the difference in the value of both projectiles; bullets being substantial more valuable, especially in Holland, with the absence of naturally occurring resources, i.e. stone, to produce bullets from, with large energy consuming project orchestrated to recover bullets. For example, after the siege of Polanen in 1351 the moat of the castle was drained to be able to recover the stone

bullets shot by the trebuchet used during the siege (De Graaf 2004, 338). And, in 1418 61 old stone projectile, deeply buried in the embankments near the fortress of Vilvorde, were dug up and re-carved by stone maser Henric Andries to a 9-inch (Cir. 22 cm) calibre to be used (Boffa 2004, 191).

If the taphanomic processes are taken into account for surviving the archaeological record for both bullets and arrow projectiles, bullets made of stone have a larger chance of surviving in the archaeological record versus the smaller fragile arrow projectiles, made of wood (Schiffer 1996, 151-7; 165-179).

Coupling the shooting of arrow-projectiles and bullets with the proposed siege techniques; arrow-projectiles are mainly anti-personnel and anti-artillery weapons, while bullets are anti-artillery and are used to destroy defensive structures (Purton 2010, 175). Therefore, arrow-projectiles were used during artillery bombardment to kill combatants handling artillery or possibly destroy the devices themselves, and were used during a combat assault to provide covering fire from enemy archers or artillery. Whereas artillery were only used during an artillery bombardment and not during a combat assault, because of the great inherent inaccuracy of artillery and possibility to hit friendly troops during the assault.

Hand arms and polearms are relative second on the ranking of being lost. The use of these different weapon is major factors for the loss of the objects. When the weapons were used in combat one slip of the hand was enough to drop the weapon. However, the location where the weapon was used and lost is of significance importance for the object to become part of the archaeological record near a castle. As state earlier, object have to be lost in or near the moat of the castle to become part of the archaeological record. During a siege hand arms were only actively used during a combat assault near the moat and only then there was a slim chance for the handler of the weapon to be on the castle wall near the moat or be on the moat itself in a boat. The main difference between hand arms and polearms for the archaeological record is that the polearm can be broken in smaller pieces; the wooden shaft of the weapon can break. However, it is impossible to recognizing if a polearm was broken prior before loss or not, because only the head survives into the archaeological record the wooden shaft deteriorates (Schiffer 1996, 151).

Last on the relative ranking of probable loss is armour, consisting of objects that are too hard to lose. Armour is worn tied on the body and secured with several leather straps or buttons, making it almost impossible to lose when being used (Goll 2009, 107-16). However, if lost during use the armour would, just like hand and polearms, be lost during a close combat assault.

Differentiating between the objects deposited by the attacking and defending side during a siege is important to be able to make a link between the military equipment used by either side. Projectiles excavated at moats are mostly likely used by the attacking force of the castle. The defenders of the castle would have been shooting from within the castle with the projectiles landing far from the castle, except for arrow-projectiles when a close combat assault would have been used. During a close combat assault defending archers would have shot at the attacking enemy combatants, increasing the odds for arrows of defending archers to be deposited in the moat. Differentiating between hand arms, polearms and armour used by either the attacking or defending side is impossible, because for the objects to be lost during their use both attacking and defending combatants would have been present near the castle moat.

4.2.3 Destruction of the castle

The military objects that could be deposited during the destruction or dismantling of a castle depends on the military objects present in the castle during the destruction, as well as on the possibility for the destroyer to capture or transport military material. If the castle was dismantled within the strategy of the scorched earth it is expected that the destroyer would try to transport as much military material as possible to enhance his war effort. However, this depends on who destroys the castle and if it is possible for the destroyer to implement the available military material.

It is expected that military material is captured during the destruction of the castle as punishment. However, the material could be deposited as part of the punishment and used as a social leveller, displaying that the destroyer does not need the material and is therefore more powerful than the castle lord of the destroyed castle.

Because of the many aspects influencing the deposition during the dismantling or destruction of a castle, it is not possible to determine which objects are when deposited. However, it can be expected that all objects present in a castle during the destruction

could be deposited. Therefore, the whole range of military material categories can be expected during a destruction.

4.3 Conclusion

Military material is a material group which is complex to define from an archaeological context, with the design of various objects overlapping with another function, for example; arrows designed for hunting or the difference between daggers and knives. The definition used for archaeological military material in this thesis is:

Material culture indicating military action occurring at a castle. These are objects with the primary function to maim or kill individuals in battle or to protect individuals versus these devices, or material culture specifically designed to destroy military structures.

The military material studied are grouped in categories and subcategories according to their difference in design, handling and dating through typologies. Four main categories were defined: hand arm, polearm, projectile and armour. The categories of hand arm and projectile were further split into two subcategories; the subcategories of sword and dagger for the category hand arm, and the subcategories of arrow-projectile and bullet for the category of projectile. The category of hand arm and armour were the only categories that could be dated through existing typologies, while for the subcategory of arrow-projectile a new typology has been proposed. This typology is based on arrowheads and consists of three arrowhead types. The differentiation between the types has been made according to the form of the arrowheads. The typology is used to date arrowheads, not by dating the individual arrowheads, but by dating an assembly of arrowheads from the same archaeological context. The dating is based on the assumption that arrowheads were designed to counter the armour worn by enemy combatants and the configuration of the assembly, i.e. the ratio of arrowhead type 1, 2, and 3, is linked to the armour commonly worn during the deposition of the assembly of arrowheads. Therefore, it is possible to link the dating of arrowheads to the dating of armour.

Determining the difference between besieged and non-besieged castles utilizing military objects is based on the assumption that during a siege more military objects will be deposited than during peacetime. A theoretical framework has been designed with the

expected deposition, through loss and discard of military objects during a siege and peacetime in the moat of the castle, and coupling the siege techniques described in chapter 3 with the deposition of the military material categories. However, during two other social or ritual events large amounts of objects could have been deposited; dismantling the castle as part of a scorch earth strategy, or the destruction of the castle as punishment, possible after a siege.

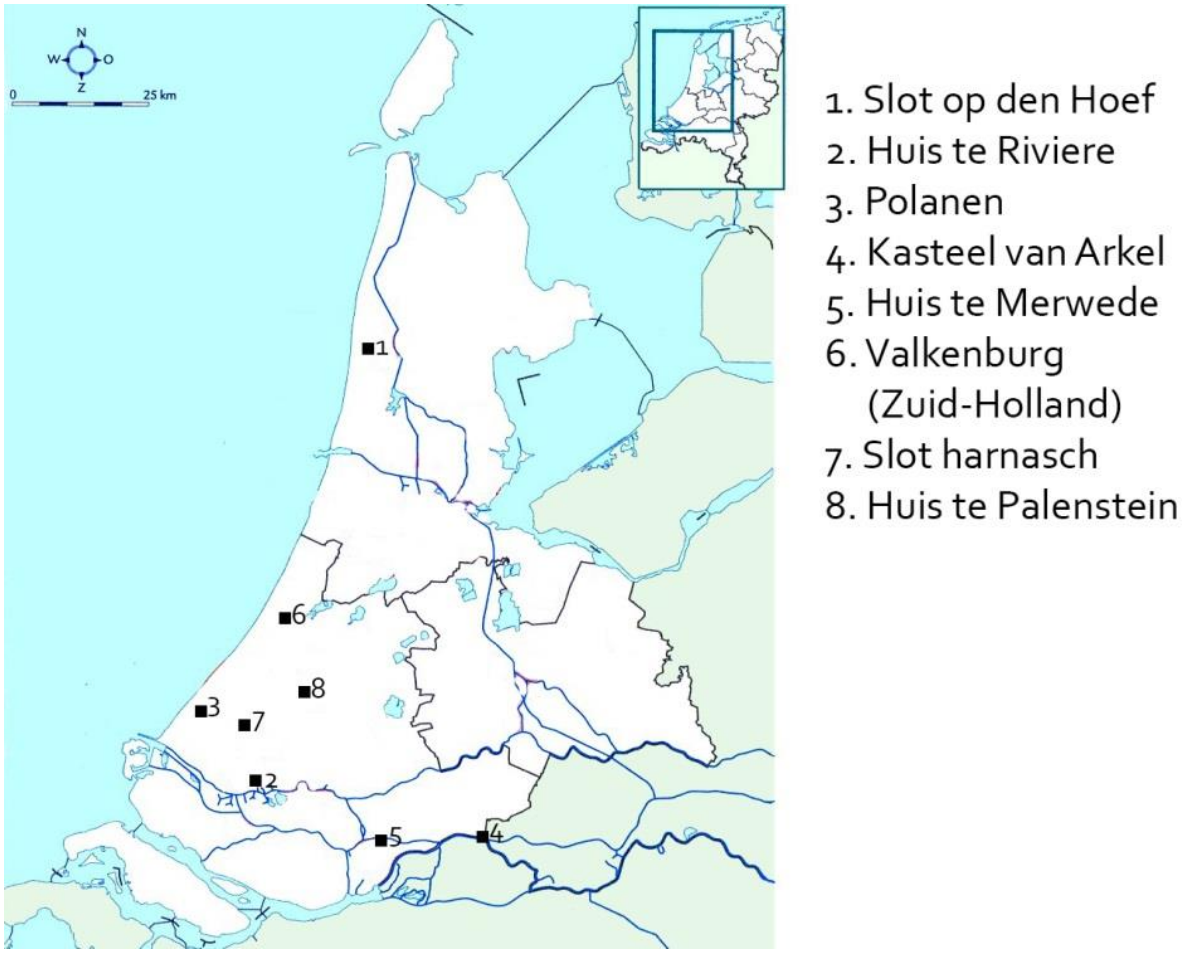
The expected deposition of military objects through discard and loss during peace is low compared to the loss of military objects during a siege. There is no expected pattern for the assembly of these military objects, because of the many complex actions and variables influencing the deposition of the objects. The expected loss of military objects during a siege, compared to the discard or loss of military objects during peace, would show a higher amount of projectiles, hand arms and polearms, depending on the siege method employed. Arrow-projectiles and bullets have a higher expected loss rate during an artillery bombard, while hand arms, pole arms and arrow projectiles have a higher expected loss rate during a close combat assault. There is no expected higher deposition of armour during either siege method, due to the nature of armour is used and worn. As a result of the high energy consumption events used to recover bullets after certain sieges, it is possible that only a small amount of the bullets remained part of the archaeological record.

The expected deposition of military objects during the destruction or dismantling of the castle is the complete range of military object categories. However, it is not possible to determine the precise difference between the deposition rate for the various categories, because of the complex factors influencing the deposition.

5. Studied castles

In this chapter descriptions of the studied castles are presented. This includes: history of the castle, (possible) sieges occurring at the castle, archaeological research, castle type and the excavated military objects at the castle. First a general summary of the archaeological research of castles in Holland is provided with goals of the research and the complexities of these researches for the study of military objects. Second, the besieged castles are presented with the respective conflicts they were besieged in; a short history of the conflicts is presented, with the military tactics deployed during the conflict. At last the castles were no historical evidence for a siege are presented and discussed.

The studied castle are: Slot op den Hoef, Huis te Riviere, Kasteel Polanen, Kasteel van Arkel, Huis te Merwede, Valkenburg (Zuid-Holland), Slot Harnasch and Huis Palenstein (see figure 5.1).



(Figure 5.1: Locations of the studied castles in Holland (after http://www.paraplu7.nl))

5.1 Archaeological research of castles in Holland

Archaeological research in Holland into castles has been conducted since the beginning of the 20th century. The earlier excavations performed, i.e. beginning and middle of the 20th century, focussed heavily on the castle as a structure and had as goal to research the development of the castle as a structure (Bult 2000, 24). Consequently, material cultures was (partly) neglected as a possible source material and the documentation, was, to modern standard, poor; this is especially true for the castles of Slot op den Hoef, Huis te Merwede and Huis te Riviere. As a result, part of the excavated artefacts are either missing or not recorded, especially the archaeological context of the material is missing, and for the studied castles the still available original documentation on the excavations consists of several day reports and a few maps, portraying the outline of the castles.

After the Second World War, through the rebuilding of Holland, an intensification in castle research occurred (Bult 2000, 24). However, still with the focus on the structure of the castle and partly neglecting the material culture. During the `70 and `80, with the development of new archaeological methods and insights, an increase in the possibilities of material culture was recognised and a shift of the goal of castle research transpired, increasing the significance of material culture in castle research. However, a large part of the castle were discovered during construction projects, meaning the excavation were rescue excavations, limiting the time duration for the excavation of the castle. For example, the castles of Polanen and Valkenburg.

Overcoming this difference in research intensity of the different castle is essential to recognise the value of the archaeological remains of each of the castles. Therefore, to overcome the difference in research intensity a rating system for the research intensity of different castles is used. This rating system is based up on the total amount of the moat has been excavated, in percentage of the total expected moat of the castle that has been excavated. Hence, the proposed theoretical framework is based on the military objects deposited in the moat of the castle.

The rating system consist out of three categories based upon excavated moats:

- **Low:** 0% - 30% excavated of the total
- **Medium:** 31% - 60% excavated of the total
- **High:** 61% - 100% excavated of the total

5.2 Besieged castes

Friese conflicts (1133-1297)

None of the studied castles has been besieged during the Friese conflicts. However, the assault and especially the tactics deployed during the assault of the castle Slot op den Hoef, understanding the earlier conflict is imperative.

The wars in West-Friesland, in the most northern part of the Holland, were long different wars fought by the counts of Holland against the West-Friezen. The West-Friezen applied guerrilla tactics to disrupt and destroy the attacking armies of Holland (De Graaf 2004, 213-5).The part of the wars important for this thesis is the last part of the conflict, whereby Floris V won and conquered the West- Friezen. The father of Floris V, Willem II was killed in action fighting the West-Friezen when Floris was young and was buried by the West- Friezen in West-Friesland (De Graaf 2004, 233-4). When Floris turned 18 he wanted revenge and started preparing a war against the West- Friezen in 1272 (De Graaf 2004, 235). Floris attacked in 1282 and conquered West-Friesland. After the conquest the power in West-Friesland had to be consolidated. Floris accomplished this by building large castle citadels in the area of West-Friesland. The castles were placed geographically in a polygon shape with one castle in the middle of the polygon (De Graaf 2004, 242).

In 1296 Floris v died after being taken hostage by several nobleman to transport Floris to England. After the death of Floris the county was placed in chaos. The son of Floris V was still young when his father died and a governor for the young boy had to be sought (De Graaf 2004, 244). The bishop of Utrecht used the disarray in the county to improve his power in the region and persuaded the West- Friezen to rebel against Holland again. The West-Friezen abandoned their old guerrilla tactics and attacked the castles of the Nieuwendoorn, Radboud and Wijdenes head on (De Graaf 2004, 244). The Hollanders

had to react quickly before the citadels in West-Friesland were destroyed. Therefore, the next year a campaign was launched against the West- Friezen (De Graaf 2004, 245). The West- Friezen were defeated in the year 1297 by the army under command Jan van Avesnes (De Graaf 2004, 246).

Military tactics

Both the armies of Holland and the West-Friezen deployed different warfare tactics. Consequently, the war fought in West-Friesland can be considered as an irregular warfare (De Graaf 2004, 213-5). The army of Holland was a traditional army, consisting of knights and supporting staff, with the goal of conquering West-Friesland, aiming to win the war with one or two main battles, while the West-Friezen deployed guerilla tactics fighting for their freedom, optimal utilizing the terrain of West-Friesland, bogs and watery areas, to perform hit-run tactics (De Graaf 2004, 214; White 2004, 311). When the West-Friezen abandoned their guerilla tactics they were eventually defeated (De Graaf 2004, 245).

5.2.1 Slot op den Hoef

The first stone building of Slot op den Hoef was built by Wouter van Egmond, part of the high nobility of Holland, in 1207. The design of the castle consisted of a large round shape with a diameter of 27 metre, forming the main keep. Later a forecourt was added, along with a large stone tower on the south side of the main keep (Burger 2008, 27). The purpose of the structure was to serve as a safe haven for the people of the surrounding area to flee to. In 1285 a large keep with side towers and living quarters was constructed on the forecourt in the shape of a square castle. Consequently, Slot op den Hoef is of the square castle type. The size of the complete floor plan of the castle was around 25x35 m (Burger 2008, 33-5). In 1321 the castle was attacked and destroyed by the West-Friezen. After the siege Jan I van Egmond rebuilt the castle. During the 14th and especially during the 15th century new add-ons were built on the castle terrain, including a new hall and a new gate building with two towers (Burger 2008, 45; 53). In 1573 the castle was destroyed on order of Willem van Oranje to prevent the Spanish from taking the castle and turning it into a base of operation (Burger 2008, 60).

Siege and other events

The siege of Slot op den Hoef is known from one chronicle and the question rises if the siege ever happened. The chronicler Hovaeus tells that the castle was besieged in 1315

and destroyed by a horde of West-Friezen (see table 5.1). Anthonius Hovaeus (?-1567) was a monk in the abbey of Egmond living in the 16th century. He used older chronicles available to him, to write a history on the family of the Vanden Huyse van Egmond (www.regionaalarchiefalkmaar.nl).

(table 5.1: Translation of the part of the Chronicle of Hoveaus)

Middle Dutch	English translation
D' welck een bederfenisse van Egmont was want in 't XIIIC ende XV sijn die Vriesen geweldelick overgecomen ende als heer Wouter vluchte tot Haerlem, hebben sij Egmont met die Hoeff tot den gront toe affgebrant, 't welck een eeuwige schade was voor 't lant van Egmont. Want nae dese brant zoo sijn dese 28 voorgenoemde mannen bijnae met alle die rijckdomme[n] uuyt Egmont gevaren om tot Haerlem ofte tot Leyden te woonen.	What was a spoilage of van Egmond (Slot op den Hoef), because in the year of 1315 the West-Friezen came and when Lord Wouter fled to Haarlem, they burned Egmond to the ground. What caused internal damage to the lands of Egmond. Because after this fire, the 28 named man (With lord Wouter), moved with the riches to Leiden or Haarlem.

The description of the destruction of the castle has not been confirmed by contemporary sources. However, the lord of Slot op den Hoef is in 1315 with 60 man in Flanders. Possibly, providing an opportunity for the West-Friezen to attack the castle, which is peradventure undermanned (Burger 2008, 36). The excavations in 1933 supported the destruction. Under the foundations of the forecourt of the castle, stones with the same dimensions of the stones of the outer wall were found supporting an earlier contemporary structure with the outer wall. This means there was a rebuilt of the western wall dating to the first half of the 14th century (Burger 2008, 38).

The other event occurring at the castle with a heightened deposition chance for military materials is destruction of the castle in 1574 on orders of the prince of Orange (Burger 2008, 60).

Excavation

Slot op den Hoef has been excavated during the years 1933-1935. During the excavation the outline of the castle walls were followed to determine the size of the castle. By following the castle walls a large part of the castle moat has been excavated (Burger 2008, 9-12). Almost the complete outline of the castle has been excavated with a large part of the internal structure of the castle. Therefore, because of the large amount of excavated area, almost the whole castle including large parts of the moat, the research intensity of the castle is high.

Military objects

During the excavation of Slot op den Hoef in total 54 military objects were excavated; 18 hand arms; 6 swords and 12 daggers, 12 polearm, 20 projectiles; 16 arrow-projectiles and 4 bullets, 1 armour piece (helmet visor) and 1 rear loader of a cannon. Nine of these objects could be dated by typological dating, with 6 objects; 3 swords, 2 daggers and 1 rear loader, not possible dating the date of the possible siege in 1315. The rest of the 48 could not be dated by typologies and are therefore dated to the dating of the castle; 1206-1572.

Conflict Zeeland bewester Schelde (1012-1323)

Many conflicts between Flanders and Holland, about Zeeland. However, the last part is interesting. In 1303 after their victory on the French in Kortrijk the Flemish started attacking Henegouwen. Jan II, count of Holland, Henegouwen and Zeeland asked his to attack the Flemish from the north; Holland was again at war with Flanders (De Graaf 2004, 178). Many of the conflicts were fought in Zeeland. In 1304 the count of Holland was besieged in Zierikzee and was locked in. Many cities in Holland capitulated to the Flemish However, Dordrecht and several other cities remained loyal to the count (De Graaf 2004, 186). The Flemish started plundering parts of Holland and started attacking the land of Merwede, including Dordrecht and the castle Huis te Merwede (Burgers 2004, 420). The Flemish could not conquer the city or the castle, and after a large defeat in Zeeland by the count of Holland the Flemish were eventually defeated (De Graaf 2004, 188-9).

Military tactics

The war was fougth between the count of Holland and the count of Flanders, both powerful and wealthy nobleman, capable of maintaining the most advanced equipment

available. For siege warfare for the early 14th century this means: artillery, ballistae, springalds and trebuchets, and personal arming crossbows, hand bows and armour based mainly on mail armour.

Hoekse and Kabeljauwse Twisten (1) (1350-1352)

During the first conflict of the Hoekse en Kabeljauwse Twisten in 1351 the castle of Polanen and Huis te Riviere were besieged. The Hoekse en Kabeljauwse twisten was a succession war in the county of Holland between Willem V, son of the emperor of the Holy Roman Empire, and his mother, the wife of the emperor, Margaretha. The succession war started when Margaretha became countess of Holland in 1345 and had to return to her husband in 1346, when a counter-king was elected in the Holy Roman Empire (De Graaf 2004, 323-4). In her name, her son Willem V, became governor of the county of Holland, Zeeland and Henegouwen. In 1349 Willem V named himself count of Holland, Zeeland and Henegouwen after being instigated by the citizens of Dordrecht (De Graaf 2004, 323-4). The succession war started. Two different factions supported the two different claims to county. The Kabeljauwen, named after the fish cod, who supported Willem V, and the Hoeken, named after fishing hooks to catch fish, who supported Margaretha (De Graaf 2004, 325). The party of the Kabeljauwen was supported by part of the nobility and most of the cities in Holland, while the Hoekse faction consisted of the old and high nobility (De Graaf 2004, 325).

The conflict between the factions escalated in 1351 when Willem V was abducted from Ath in Henegouwen by Kabeljauwen and transported to Delft. His mother had secret discussions with Edward III about handing the county over to England and the Kabeljauwen wanted to prevent English influence in Holland. After the transportation of Willem V to Delft the military part of the conflict started (De Graaf 2004, 326). Margaretha fled Holland and Willem realised he had to use the absence of Margaretha efficiently. The Hoekse nobility owned a large part of the castles in Holland which posed a threat to Willem consolidation of his power in Holland. These castles had to be taken quickly before Margaretha could re-supply the castles with troops and materials (De Graaf 2004, 332). Willem conquered almost all the owned castles by the Hoeken in a very short time span including the castles of Huis te Riviere and Kasteel Polanen.

Military tactics

The most noteworthy factor of the war is the small timespan wherein Willem conquered the large amount of castles. Willem used the tactic of castle hopping. By hopping with his army from castles to castle he made it possible for the same equipment be used in several different sieges (De Graaf 2004, 331). As a result, he made optimal use of the same equipment and only had to construct a hand full of siege engines. However, Willem did have a time constraint wherein he had to conquer all the castles.

5.2.2 Huis te Riviere

Huis te Riviere was built in 1260 by the countess of Henegouwen, the aunt of Floris V, part of the very high nobility in Holland. The first structure was a square tower of 12x12m which stood on a small mount. In the third quarter of the 13th century this structure was taken up into a newly constructed, larger structure (Jansen 1996, 59). Huis te Riviere was one the first castles of the square castle type in Holland. This new castle consisted of an outer bailey and a main structure of 20x17.50 metres. During the 14th century a moat was dug through the forecourt to separate the castle from the forecourt. In 1351 the castle was partly destroyed by the citizens of Schiedam or siege. After the destruction the castle was rebuild and the gate was replaced to south side of the building and a moat was placed around the central keep (Renaud 1955, 127). The castle consisted of a main build and an outer bailey, which were both surrounded by moats. The castle was destroyed in in 1574, on demand of the prince of Orange, in fear the Spanish would use the castle during the Dutch revolt (Renaud 1955, 126).

Siege and other events

Huis te Riviere was a castle governed by the Hoekse nobility and was claimed in the early days of the Hoekse en Kabeljauwse Twisten. The castle was handed over to Willem without having to use force (De Graaf 2004, 334). Therefore, the question rises if the claiming of the castle involved any military intervention. The castle was party damaged during this conflict. Again the castle was damaged in 1418 and eventually destroyed in 1573 by order of the prince of Orange (Renaud 1955, 139).

Excavations

Several excavations have been done at the terrain of Huis te Riviere. The first archaeological excavation was done by J.G.N. Renaud between the years 1947-8 (Renaud 1955, 126). In 1961 C. Hoek excavated the south and east side of the castle

(Hoek 1963, 103). The last excavation was done by Bureau Ouheidkundig Onderzoek van Gemeentewerken Rotterdam in 1996. A large part of the castle has been excavated, but the focus of the excavations was mainly on the structure of the castle and large parts of the moat were not excavated. Therefore, the research intensity of the castle can be placed in the category medium.

Military objects

In total 24 military objects were excavated during the three excavations occurring at the Huis te Riviere; 4 hand arms; 3 daggers and 1 sword, 14 Projectiles; 6 arrow-projectiles and 8 bullets, 2 cannon barrels and 4 cannon rear loaders. Of the 24 objects 10 objects could be dated by existing typologies or development history of weapons; 3 daggers, 1 sword, 3 rear loaders and 2 cannons barrels, all objects dating after the possible siege of the castle in 1351 and the possible destruction of the castle in 1418. However, all objects possibly date to the destruction of the castle in the 16th century. The other 14 objects are dated to the period of existence of the castle; 1260-1574.

5.2.3 Kasteel Polanen

Kasteel Polanen is a castle of the type keep castle near the town of Monster (Janssen 1996, 83). Polanen was built in the year 1295 by Philips van Duivenvoord, a rising star in the nobility in Holland, and consisted of a large island of 42 x 29 m, with a stone keep of 11 x 11 m. The moat surrounding the castle was 12 m wide and the keep was located on the northeaster part of the island (Bult 2001, 77). During the first half of the 14th century a hall was constructed next to keep of the castle and several side buildings were constructed on the other side of the island (Bult 2001, 88). By examining the debris excavated from the moat the height of the tower could be reconstructed to 12 m high (Bult 2001, 79). The castle was destroyed after the siege of 1351. After the destruction of the castle in 1351, the castle was restored and sporadically used as a residence and eventually destroyed in 1393 (Bult 2001, 87).

Siege and other events

During the siege of Polanen the castle was owned by Jan van Polanen a wealthy nobleman. The accounts for the siege of Polanen have survived and it is possible to make some remarks on the materials deployed during the siege. For the siege of Polanen twenty-four English mercenaries were hired, a trebuchet and a *mol*, a device

used to protect soldiers and enabling them to attack the enemy structure, were transported to Polanen and an *evenhoghe* (siege tower) was constructed for the siege.

In total 5000 *Pielysers* and 300 *ongheyserde schachten* were bought. As described in the introduction, the precise definition of these objects is unknown. After the siege of Polanen the castle moat was drained, using a dam to block the water supply to the moat, to retrieve a part of the stone bullets shot by the trebuchet (De Graaf 2004, 338). The stone projectiles shot by the trebuchet were made in stone-ovens in the monasteries in Delft and part of the walls of the monasteries were used as projectiles. When the demand for stones could not be maintained by the monasteries stone-ovens and the monasteries walls crippled down, even stones from the streets of Leiden were used as projectiles (De Graaf 2004, 336-37). The siege of Polanen started in early June and ended on the 20th of June, the whole siege lasted around three weeks (De Graaf 2004, 478). The castle was finally destroyed in 1394 (Bult 2001, 88).

Excavation

Polanen has been excavated in the year 1981 under supervision by E.J. Bult. Almost the complete outline of the castle ssland and moat have been excavated, but at the castle island only the keep and a well have been excavated (Bult 2001, 72). More than 30% of the castle terrain has been excavated, but because not the complete castle island and not the outer edges of the moat have been excavated the research intensity of the castle is medium.

Military objects

In total 32 military objects were excavated at the castle of Polanen; 32 projectiles; 7 arrow-projectiles and 25 bullets. All 32 objects could not be dated by existing typologies, therefore the objects are dated to the dating of the castle; 1295-1351.

Oorlog om Arkel (1401-1412)

The Arkelse Oorlog consisted of several wars fought between the counts of Holland and the family Van Arkel between the years 1401-1412. The family of Van Arkel were in feudal service of the count of Holland. There are several different incentives starting the war, with the most important reasons the personal hostility between lord Jan V van Arkel and the son of count Albrecht van Beieren, Willem VI van Oostervant (Waale

1990b, 88). The wars started after the political functions of Jan were no longer extended and after at least one trial, the fiefs of Jan in Holland were annexed in 1400 and Jan was banished from Holland. Jan send an *ontzegbrief* to Albrecht dismissing himself from his feudal services to the count and the war started (Waale 1990b, 94). During the war several smaller sieges and plundering happened. However, the seminal event for this thesis is the siege of Gorinchem in 1402 by the count of Holland and the troops of Utrecht.

The city of Gorinchem was under control of the Van Arkel's since the mid-13th century. To the east, adjacent to the city was the castle Huis van Arkel. During the siege of Gorinchem not only the city was attacked, but the Huis van Arkel as well (Waale 1990b, 102). The siege of the city and the castle lasted 12 weeks. The damage to the city was minimal and only the large tower of the castle was destroyed (Waale 1990b, 103). The troops of Holland and Utrecht retreated. The wars continued, but the Huis van Arkel did not see any more actions during the wars.

Eventually the war changed from a war between the count of Holland and the family Van Arkel to a war between the duke of Gelre and the count of Holland. After the war the Huis van Arkel was destroyed in 1412, after the governance of the city Gorinchem came in the hands of Holland (Waale 1990b, 147).

Military tactics

The conflict was fought between two wealthy and politically powerful lords. Both lords were supported by neighbouring lords; the count of Holland by the bishop of Utrecht and the Lord of Van Arkel, was supported by the Duke of Gelre. Consequently, both sides had the economic potential to deploy large armies, equipped with the most technologically advanced weapons.

5.2.4 Huis van Arkel

The Huis van Arkel was built in the period of 1267-1290, by Jan II van Arkel, part of the very high nobility of Holland. The castle was located 600 metre east from the medieval city of Gorinchem and was of square castle type. In 1412 the castle was destroyed, after the Oorlog om Arkel (Waale 1990, 147). The castle had a square floor plan with several large towers on the corners and a large gatehouse with several smaller gatehouses

(Waale 1990, 144-6). The dimensions of the complete castle were 36 x 36 m and with a moat of between 13 and 16 metre wide (Flore 1998, 202).

Siege and other events

The castle Huis van Arkel was besieged in 1402 by the count of Holland and the bishop of Utrecht. The city and the castle were defended by 2000 man under the command of Jan van Arkel, which can be as one of the richest individuals of Holland, and 600 armed man from the city itself (De Waale 1990, 102). The attacking army under command of Willem V consisted of 5000 man (De Waale 1990, 101). During the siege both sides used *steenbussen* which had little to no effect. Several attempts were made by the defenders to end the siege by attacking the besieging army. These attacks were made by the soldiers of Jan van Arkel with small successes, but they were not able to lift the siege. During the siege the main tower of the castle was destroyed, but the rest of the castle and the city were not severely harmed (De Waale 1990, 103). In 1412 the castle was destroyed by the count of Holland.

Excavation

No complete excavation happened at Huis van Arkel. In 1996 the location of the castle was designated to be become a nature reserve. After finding several pieces of pottery dating to the 14th century, the top layer of the soil was removed to value the quality of the archaeological remains of the castle (Floore 1998, 201). The remains of the castle were drawn and partly cleaned. The quality of the archaeological context was of such high degree that the city of Gorinchem decided to persevere the remains *in situ* (Floore 1998, 202). Because no full excavation occurred at the castle terrain and only the top layer of the castle was uncovered, the information density on Huis van Arkel is low.

Military objects

In total 39 military objects were excavated at the castle Kasteel van Arkel; 38 projectiles; 23 arrow-projectiles and 15 bullets, 1 piece of armour (mail shirt). None of the military objects could be dated by existing typologies. However, the precise excavation locations of the object are unknown. Therefore, all objects are dated to dating of the castle; 1267-1412.

Hoekse en Kabeljauwse Twisten (2) (1418-1426)

The discrepancies between the Hoekse and Kabeljauwse faction in Holland continued into the early 15th century with the acquiring of the county of Holland by the Duke of Burgundy. Another succession war occurred with the two factions, Hoeken and Kabeljauwen, standing on opposite sites. The cause of the war was the marriage of Jacoba van Beieren with Jan IV of Brabant. Jacoba van Beieren was daughter of Willem VI count of Holland which died without a son, therefore the partner of Jacoba could be the new count of Holland (Stein 2014, 44). The marriage between Jacoba and Jan was within the third degree of family ties. Therefore, in order to fulfil the marriage, dispensation had to be granted by the pope. Jan van Beieren, the uncle of Jacoba, and Sigismund, Emperor of the Holy Roman Empire, were against the marriage and asked the pope to deny the right to marriage (Stein 2014, 44).

The letter disbanding the marriage arrived too late and the marriage was fulfilled. Jacoba chose the faction of the Hoeken to enable her the support of the nobility in Holland, while her uncle Jan van Beieren was supported by the Kabeljouwen, the succession war started. Important for the thesis is the siege of Dordrecht in 1418. Dordrecht had chosen the side of the Kabeljauwen and started to plunder the countryside. Jacoba and her husband, Jan IV, besieged Dordrecht. Jacoba took residence in Huis te Merwede. The siege was unsuccessful and the Dordrechtenaren repealed the siege, and conducted a counter attack. During this counterattack Jacoba had to flee the castle Huis te Merwede and the castle was destroyed (Boer *et all* 1996, 152).

Military tactics

The precise tactics or specific equipment is unknown. However, both the city of Dordrecht, and Jacoba and her husband were economically capable to provide the most technological advanced equipment during the siege. For the early century would mean a large diversity in firearms size, while still possible using springalds, trebuchets and ballistae. The personal arming would consist of large variety of hand arms, crossbows and hand bows, and both mail, plate and cloth armour used.

5.2.5 Huis te Merwede

The history of Huis te Merwede can be divided into two parts, linked to the two castles different castles built at the same location, both castles were of the square castle type (Weijs 2011, 7). The first castle was built around the year 1300 by Daniel IV,

Baanderheer and a very wealthy nobleman, and consisted of a ground plan of 25x25 metre. This structure existed of three towers. The northeast tower was a large square tower and the main keep, the south side towers were of circular design (Weijs 2011, 14). This castle was besieged in 1304 by the Duke of Brabant and Count of Flanders. This castle was soon after being finishing badly damaged by flooding and a new larger castle was erected. This new castle was constructed between the years 1325 and 1355 and consisted of a square ground plan of 34x35 metre (Weijs 2011, 17). The same design was used as the earlier castle, but more outbuildings were added to the total structure and the main keep was moved from the northeast corner to the northwest corner of the castle (Weijs 2011, 17; 18). In 1418 Willem van Brederode, the owner at that time, chose the side of the Hoeken and Jacoba van Beieren used the castle as base of operation to attack the city of Dordrecht. After losing the siege of Dordrecht Jacoba had to flee or was driven out of the castle, and the castle was destroyed by the citizens of Dordrecht (Weijs 2011, 17). In 1421 the still standing structure was flooded for 300 years by the St-Elisabeth flood (Weijs 2011, 17).

Siege and other events

The siege of the castle in 1304 has been described by Melis Stocke in his Rijmkroniek of Hollan (366-1305) (see table 5.2). However, he does not describe the precise action undertaken by either side.

(Table 5.2: description of the attack by the Flemish and Brabant's on the land of Merwede by Melis Stocke (Burgers 2004, 420).

Middle Dutch	English translation
Dus wilden si Dordrecht delen daer. Ende sine quamen nye so naer, Dat si ter Merweden dorsten landen, Si mosten rumen met groten scanden. Dat huys was beset so wale, Ende men hilt ten selven male Met Dordrecht, die goede vesten, Tsgraven behoef ende tsinen besten	They wanted to split Dordrecht. And came so close that they had to courage to land in the Land of the Merwede. However, they had flee with shame. The castle was well defended and as well the city. Therefore, the city and the land remained in control by the count.

The other event the destruction of the castle in 1418 is based on a myth. According to tradition the citizens of Dordrecht assaulted or plundered Huis te Merwede after the siege of Dordrecht in 1418. However, no historical sources described the event (Weijs

2011, 17). Therefore, the particular military events occurring during the destruction of the castle are unknown.

Excavation

Huis te Merwede was excavated during the years 1940-3 on demand of the city of Dordrecht. The excavations were done under supervision of J.G.N. Renaud (Weijs 2011, 12). The goal of the excavation was to discover the remains of the castle and determine the design of the castle. Only the remains of the main keep were excavated. A large part of the moat and forecourt remain *in situ* (Weijs 2011, 13). The main keep has almost been completely excavated. However, only a small part of the original moat has been excavated and not the forecourt. Therefore, the research intensity of the castle can be defined as low.

Military material

In total 13 military objects were excavated at the castle of Huis te Merwede; 2 hand arms; 1 dagger and 1 buckler, 10 projectiles; 8 arrow-projectiles and 2 bullets, and 1 piece of armour (shoulder guard). Only the shoulder guard could be dated by existing typological dating, dated to 1375-1500. The rest of the objects were dated to the dating of the castle; 1300-1421.

5.3 Non-besieged castles

5.3.1. Valkenburg (Zuid-Holland)

The moated site near the city of Valkenburg, Zuid-Holland, was found during an excavation in 1987-88 to Roman remains (Bult and Hallewas 1990, 198). The site could be recognized as a moated site by the toppled building remains of a stone wall one stone tick, made of bricks 30x15x7 cm in dimension, and parts of a slate roof, in the moat surrounding the site, and through genealogical research it is known that the moated site was resided by the family Van Specke, which were of the class *welgheborende*. However, these were not the primary constructer of the moated site. (Bult Hallewas 1990, 189; 191; 195). The island the main keep was located on was a 15x12 m in size, surrounded by a moat of 4 a 4.5 wide. The main island was not large enough to support agricultural structures (Bult and Hallewas 1990, 194). the structure was a moated site. The excavated material culture has been dated to the 14th century, dating the moated site in the 14th century (Bult and Hallewas 1990, 196). Almost the

complete moat and island where the moated site was constructed on has been excavated (Bult and Hallewas 1990, 188). Therefore, the research intensity of the castle Valkenburg (Zuid-Holland) is high.

Military objects

In total 3 military objects were excavated at the castle Valkenburg (Zuid-Holland); 3 pieces of armour. The 3 pieces are made of leather and consist out of 1 shoulder guard and a 2 possible chest or limb protectors. The 2 possible chest protectors were possibly of the same object and were recognized as armour by the stick holes made in the leather. The objects could not be dated by existing typologies. Therefore, are dated to the dating of the castle; 1300-1400.

5.3.2 Slot Harnasch

During an excavation with test trenches in the Harnaschpolder in 2010 a moated site was discovered, dated from the early 14th century to approximately 1450 (Bult 2014, 3; 265). The location could be recognized as a moated site by combining archaeological and historical research; the combination of the excavated of material culture, high percentage of *steengoed* and objects pointing to the use of horses near the structures, the presence of an almost 6 m wide moat, and the owning of the structure by a *welgeborene*, Jacob Heer van Spalandt en Harnasse, point to the structure as moated site named Huis or Slot Harnasch (Bult 2014, 289-90). The precise dimensions of the structure are unknown. However, the structure was constructed out of stone bricks and was surrounded by a double moat (Bult 2014, 269-70). Only a small part of the southeastern corner of the complete island and moat have been excavated (Bult 2014, 269). Therefore, the research intensity for Slot Harnasch is low.

Military objects

In total 1 military object has been excavated at castle Slot Harnasch; 1 projectile (1 arrow-projectile).

The arrowhead is by context dating dated to the last quarter of the 14th century and the first quarter of the 15th century. The arrowhead is a type 2 arrowhead with a socket diameter of 10 mm (Bult 2014, 155).

5.3.3 Huis te Palenstein

The construction of Huis te Palenstein was commenced by Willem I van Egmond, he was part of the old *Ridderscap* in Holland. Construction on the castle begun between 1375 and 1398. However, the precise date of the start of the construction of the castle is unknown (Westenbroek 1993, 12). The castle is of the keep tower type. During the 15th century several structures were added to Huis te Palenstein. In the middle of the 15th century the main keep was expanded. Palenstein had a forecourt with several buildings. This forecourt had no moat surrounding it (Westenbroek 1993, 118-19). After the 15th century the main castle structure was barely inhabited. The castle never saw real military actions, but during the turbulent period of 1488-1490 the castle was occupied by six soldiers under command of the city of Leiden (Westenbroek 1993, 116).

Excavation

Huis te Palenstein has been excavated by the local history society of Zoetermeer, Historisch Genootschap Oud Soetermeer, during the years 1984-6 and 1992 (Westenbroek and Van Domburg 1993, 56). In total one-third of the suspected main keep and the moat surrounding it had been excavated, in addition with a part of the forecourt (Westenbroek and Van Domburg 1993, 55). In total less than 30% of the total suspected castle terrain had been excavated. Therefore, the research intensity for Huis Palenstein is low

Military material culture

In total 4 military objects have been excavated at the castle of Huis te Palenstein; 1 hand arm (1 dagger), 2 projectiles (2 bullets), and a few rings of mail, counted as one object. Only the dagger could be dated, both by existing typologies and context dating, combining the two dating's, the daggers dates between 1325 and 1375. However, the dagger was excavated from a layer pre-dating the castle. Therefore, is not taken into account with the analyse of the castles. Both the bullets and the mail rings could not be dated by existing typologies. Therefore, are dated to the dating of castle 1375-1500.

5.4 Conclusion

Combining the information presented in this chapter on the history, excavation, siege and military materials, the following table can be constructed (see table 5.3).

(Table 5.3: Background information of the examined castled)

Castle	Type	Research intensity	Castle dating	Date siege	Amount of objects
Slot op den Hoef	Square	High	1206 – 1572	1315	54
Huis te Riviere	Square	Medium	1260 – 1573	1351	24
Kasteel Polanen	Keep tower	Medium	1295 – 1351	1351	32
Huis van Arkel	Square	Low	1267 – 1412	1402	39
Huis te Merwede	Square	Low	1300 – 1421	1418	13
Valkenbrug	Moated site	Low	1300 – 1400	-	3
Slot Harnasch	Moated site	High	1300 – 1450	-	1
Huis te Palenstein	Keep tower	Low	1375 – 1500	-	3

6. Discussion

In this chapter the results of the eight examined castles and the provided theoretical background on siege warfare and castle types are discussed to provide an answer for the main research question. The discussion is structured as followed: (1) first, the proposed theoretical framework on the deposition of military objects at castles is appraised by combining the archaeological and historical sources of the events transpired at six of studied castles. (2) Second, the castle types and military material excavated at the studied objects are revised to confer a possible different interpretation of the link between castle type and military function and relevance. (3) At last a recommendation for further research is presented.

6.1 Testing the theoretical framework

The proposed theoretical framework for the expected deposition of military material during a siege, destruction or dismantling of a castle will be tested by five of the eight castles studied in this thesis. These are the castle of Kasteel Polanen, Huis te Merwede, Kasteel van Arkel, Huis te Riviere and Huis te Merwede. These castles have been selected because of the historical data available on the events that have, according to the theoretical framework, an expected heightened deposition of military material. Therefore, by combining the archaeological and historical research it is possible to test the proposed theoretical framework and determine during which event or events the military objects were probably deposited. First the archaeological data is presented, than historical data and at last, a conclusion for each castle will be presented (Roos 2015, 93-6). At the end of this subchapter a conclusion is presented on the viability of the proposed theoretical framework.

6.1.1 Slot op den Hoef

Two events transpired at the castle Slot op den Hoef with a heightened probability of deposition of military material; siege of the castle in 1315 and the destruction of the castle in 1574.

Three swords, 10 daggers, 12 polearms and 16 arrow-projectiles, all were dated by the dating of the castle. Therefore, the military objects can be possible deposited during the destruction of the castle in 1573 or the siege of the castle. The four bullets excavated were between 70 and 110 mm in diameter, commonly used with firearms, and considerably smaller than the trebuchet bullets used during the siege of the castle

Kasteel van Polanen. As a result, the bullets are not interpreted as trebuchet bullets and do not date to the siege in 1315. Two swords and two daggers are dating from the 16th century, and are therefore ascribed to the destruction of the castle.

Siege of 1315

Archaeological excavations conclude that the castle Slot op den Hoef was partly rebuild during the first half of the 14th century, in conjunction with the strong possibility of the partly destruction of the castle (Burger 2008, 38). The, partial, burning of the castle is known from one historical source, by Anthonius Hovaeus, describing a possible siege in 1315 (www.regionaalarchiefalkmaar.nl).

It is probable to date the assembly of the arrowheads; all 16 arrow- projectiles, with the exception of one, are all of the type 1 arrowhead, designed to pierce cloth and mail armour, commonly worn in the first quarter of the 14th century, supporting the idea that the arrowheads were deposited during the siege of the castle (Blair 1958, 37-52). Because the swords, daggers and polearms can be dated to the complete dating of the castle, it is not possible to link these objects to the particular event of the siege of the castle. However, the deposition of arrow-projectiles, polearms, hand arms and the absence of bullets used by artillery support a close combat assault of the castle; the siege method decorous for the West-Friezen, in line with their guerrilla tactics deployed during the previous wars (De Graaf 2004, 245). Furthermore, the absence of the lord of the castle with a large part of his garrison in 1315, could have enabled the Westfriezen the opportunity to attack and raid the castle (Burger 2008, 36).

Conclusion

Therefore, because of: (1) the high a mount type 1 arrowheads present at the castle, (2) the probable dating of polearm and hand arm to the first half of the 14th century, (3) the absence of artillery bullets, (4) and the absence of a large garrison at the castle, it is very probably that the castle was partly destroyed by the Westfriezen in 1315 during a close combat assault.

6.1.2 Huis te Riviere

Three major events occurred at Huis te Riviere whereby there was a heightened possibility for the deposition of military material; The claiming of the house in 1351 by Willem IV during the conflict of the Hoekse en Kabeljauwse twisten, the change of party

of the castle in 1418 and the destruction of the castle in 1573. Because it is possible to date a part of the military objects by typologies, they can be linked to the specific events. 18 of the 25 objects date later than the 14th century. Therefore, not possible dating to claiming of the house in 1351. Only one dagger does not possibly date to the later part of the 16th century, during the destruction of the castle. The objects possibly dating to the 16th century consist of 8 bullets, 2 cannon barrels, that were expected part of the same cannon, 4 rear loaders for cannons whereby 2 rear loaders probably were used in conjunction with the 2 cannon barrels, and 1 sword and 2 daggers, that specifically date the second half of the 16th century. The rear loaders date post first half of the first century, because rear loaders were introduced during the second half of the 15th century (DeVries and Smith 2005, 46).

The eight bullets can as well date to the destruction of the castle in 1573 as the possible destruction of the castle in 1418. However, the diameter of the bullet match the diameter used in conjunction with the deposited cannon barrel. Therefore, it probable that the bullets were deposited during the destruction of the castle.

The five arrow-projectiles consist of one arrow shaft of an arrow shot by a hand bow and four arrowheads. The arrowheads consist of two type 2 arrowheads and two undefined arrowhead types, but both with a thick square section, usually used against plate armour. Therefore, the arrows can date both to the event occurring in 1351 and 1418.

Claiming of the by Willem IV in 1351

During the Hoekse en Kabeljauwse twisten the castle was owned by Daniel van Matenesse, a supporter of Margaretha and a Hoek. Willem IV could claim the castle, because after the construction of the castle in 1260 the castle was denounced by the count of Holland as “open huis”, giving him and his heirs the right to enter the castle at all moments (Renaud 1955, 138). After the hostilities between Margaretha were resolved, Daniel was allowed to return to his castle. In a document dating to 1355 it is stated that the castle was heavily damaged and the castle should be repaired (Renaud 1955, 138). This could be as resolve of the claiming of the castle by Willem and could have been damaged as a punishment with possibly depositing military objects in the castle.

Change of owner of the castle 1418

After the failed siege of Dordrecht in 1418 by Jacoba van Beieren she ordered Adrian van Matenesse, the caste lord at that time, to claim Schiedam for her (Renaud 1955, 139). This went without much *vyandlykheid* (hostilities) (Mieris 1732, 24). After Jacoba was defeated the castle was claimed by Willem van Egmond until finally Adrian was allowed to return to his castle (Renaud 1955, 139). There is no historical evidence that during this period the castle was damaged, but again it is possible that part of the castle was damaged, along with materials in the castle as punishment,

Destruction of the castle in 1573

Huis te Riviere was finally destroyed by the city of Schiedam in 1573 on demand of the Prince of Orange, to prevent the castle to be used by the Spanish army (Renaud 1955, 139).

Conclusion

Comparing the archaeological evidence with the historical data the deposition of part of the objects can be placed within a specific event. However, it is not possible to link the deposition of all objects to one of these event, because of the lack of precise dating of the objects or the specific description of the historical events occurring at the castle. All objects dating to the 16th century can be definitely linked to the destruction with castle, along with a high probable change of the deposition of cannon barrels, rear loaders and bullets during the destruction. To prevent the Spanish from using the objects along with castle.

The deposition of the arrow-projectiles is more complex. The arrowheads can be dated to both events in 1351 and 1418 and even possibly to the destruction of castle in 1573, because it is not uncommon for old military material to be present in a castle. Because only five arrow-projectiles were excavated and they are all dissimilar in configuration, that they were deposited not during a single event, but independently during the course of the existence of the castle. Therefore, no conclusive evidence on the deposition of the arrows can be made, because of the lack of precise dating of the objects and historical description of the possible deposition events.

The low amounts of projectiles and the absence of historical sources describing a siege, denote the absence of a siege occurring at the castle Huis te Riviere. Therefore, all the military objects excavated at Huis te Riviere were not deposited by a besieger of the castle, but were present in the castle prior to deposition.

6.1.3 Polanen

The military objects of the excavation of Polanen consist completely of projectiles, with 25 bullets and 7 arrow-projectiles. The bullets can be further divided into two different type of bullets, 4 round sandstone bullets and 21 rectangular blue hardstone bullets. It was not possible to study the round bullets, because they were displayed behind a large glass panel. Therefore, no further hard conclusion can be made on the size and weight of these bullets. The rectangular bullets were all approximately the same size. The stones were weighted before transport to their current storage location and weighted all approximately 70 kg. Several of the rectangular bullets had remnants of construction marks on them, such as cut off corners and decorations. Because of the dating of the bullets in the mid-14th century, the shape, partly rectangular, and the large size of the bullets they had to shot with a trebuchet.

Two events occurred at the castle of Polanen were there was a heightened probability of deposition of the castle; the siege of the castle in 1351 and the destruction of the castle in 1394 (Bult 2001, 87-8). However, because the castle was hardly resided in after 1351, the destruction of the castle is not considered an event with a higher probability of deposition of military material. Furthermore, the stratigraphical position of the bullits in the moat was under the lowest layer of debris, while a second layer of debris was located on top of a layer of mud on top of the oldest layer of debris. The oldest layer of debris is attributed to the first siege of 1351 and the second layer of debris to the final period of destruction in 1394 (Bult 2001, 78). Here, only the siege of 1351 is discussed.

The differentiation of the bullets into two groups coincide with the two bullet groups described in the historical research; bullets baked in stone ovens and bullets made from building remains of the monasteries or streets of Leiden (De Graaf 2004, 336-7). Because the round bullets were not available for study, it is not possible to determine if they were made in stone ovens. However, because of the construction remains on part of the

rectangular bullets, it is considerably probable that the rectangular bullets were originally used as construction material for monasteries or the streets from Leiden.

The arrow projectiles can be, as well, divided into two different object types; five smaller projectiles of type 1 and two arrowhead and two larger type 3 arrowheads. The type 1 and 2 arrowheads were shot with hand or crossbows, while the larger type 3 arrowheads could have been shot with *ballistae* or springalds, or were polearm heads. It is tempting to directly link the type 1 and 2 arrowheads to the 5000 *pielysers* and the type 3 arrowhead to the 300 *ongheyserde schachten,* because of the inherent difference in shooting speed of both hand and crossbows, compared to *ballistae* and springalds (De Graaf 2004, 337;Bartlett 1995, 21-2; Waale 1992, 305). However, as demonstrated in chapter 4, type 3 arrowheads could be polearm heads. With the several siege engines, allegedly, present during the siege of the castle, an *evenhoghe* and a *mol*, designed to be used in a close combat assault, the interpretation of the type 3 arrowheads as polearms is not illogical (De Graaf 2004, 337). Furthermore, a specific differentiation in words is chosen to describe the two objects. The first *pielysers* refers to the iron part of an arrow, the arrowhead, while the *ongheyserde schachten* reverses to a shaft without ironparts. Therefore, it is logical that, because both objects are mentioned within the same documents and in the same bill, the shafts and the arrowheads were combined to form a complete arrow, and not as De Graaf suggests that both objects are different (De Graaf 338). It is not uncommon during the late Middle Ages to deliver shafts and projectile heads separately. The low amount of shafts ordered compared to arrowheads can be explained by the proneness of both objects. Shafts made from wood are prone to weather and especially humidity, possibly bending the shafts making them useless, whereas arrowheads are less prone to weather conditions. The large differentiation between the 300 shafts compared to the 5000 arrowheads can be elucidated by the difference capabilities of both objects, iron arrowheads are for easier to store for a longer time comparted to shafts.

The *ongheyserde schachten* were probable purchased to be used on arrow-projectiles, because the high amount of polearm shafts are illogical compared to the 24 english mercenaries and contingent from Holland present during the sieges (De Graaf 2004, 338). Therefore, the type 1 and 2 arrowheads excavated were likely part of the 5000 arrowheads purchased for the siege, to be used with the 300 shafts bought, while the

type 3 arrowheads were likely used as polearms during one of the close combat assaults on the castle.

Conclusion

It can be concluded that the objects excavated at the castle of Polanen were deposited during the siege of the castle in 1351. However, only a handful of the minimal 300 arrows purchased have survived in the archaeological record. The arrowheads were probable shot by the besiegers, while the polearms heads could have been used by both sides. The siege methods deployed by the besieger were artillery bombardment and a close combat assault.

6.1.4. Van Arkel

Two events occurred during the existence of the castle Kasteel van Arkel that possible explain the high amount of military material deposited at the castle; the siege of the castle in 1402 and the destruction of the castle in 1418. The military material excavated at the castle, 38 projectiles (23 arrow-projectiles and 15 bullets), 1 piece of armour (mail shirt), support the dating of the objects in the early 15th century. The assembly of arrowheads consists of 9 type 1, 7 type 2 and 9 type 3 arrowheads, and 5 untyped arrowheads. The nearly half and half divide into type 1 and 2 arrowheads is in line with the expected armour worn during the early 15th century; partly plate, mail and cloth armour (Blair 1958, 53-77). The assembly of bullets with a range between 10 and 40 cm diameter is comparable with the artillery used in the 15th century in Holland (Waale 1992, 305). Therefore, it is very probable that the objects were deposited during the early 15th century.

A report on the excavations location of the objects does not currently exist. However, a map with the excavated remains of the castle and the locations of several bullets does exist (Floore 1996, 200). The bullets are located in the moat, adjacent to brick walls of the castle. Because of the short difference in timespan between both the siege and destruction of the castle, 10 years, and transpiring of both events during the same conflict, no significant difference in dating and composition of the military material is expected between both events. The location of the excavated bullets, the moat, in addition does not provide insight into a difference in deposition of military material during both events. The expected deposition of military objects during a siege and destruction is both in the moat. Furthermore, there is no expected difference in military

equipment deployed by Willem VI and Jan van Arkel during the siege of the castle. Both the besieger and defender were military powerful and wealthy lords, with access to the most advanced and expensive artillery available.

Historical research does provide insight in the artillery deployed by both sides. The exact artillery deployed by both sides is unknown during the siege of the castle Kasteel van Arkel. However, data is available for the siege of the castle of Hagestein and Everstein, three years later. The count of Holland deployed several large *bombards*, firing stone upto 400 kg, during the siege of Hagestein. Along with 30 *vogelaars* firing stones upto 50 kg (Waale 1991, 339). While during the siege of Everstein trebuchets were still deployed. The Lord Jan van Arkel had one or two *bombardments* in his castle of Hagestein and had deployed a handful of *vogelaars*. Both sides deployed smaller firearms, *loodbussen*, and hand- and crossbowman (Waale 1991, 338). This corresponds with the weight and dimensions of bullets excavated at the castle (see table 6.1). Therefore, there is no discrepancy between the count of Holland and the Lord Jan van Arkel in available artillery for defending or attacking the castle. Consequently, no decisive conclusion can be based on the equipment available. As a result, it is impossible to make a decisive conclusion apropos during which event the objects were deposited, using dating and excavation location of the bullets, or artillery deployed by both sides.

(Table 6.1: Dimensions and weight of several Bullets excavated at castle Kasteel van Arkel)

Obj. Number	Diameter (cm)	Weight (Kg)
1167	31	45
1168	40	80
1169	26	18.5
1171	12	2.2
1172	15	

No excavations location is known on the arrow-projectiles found and the dating of the arrow-projectiles also does not provide information on the deposition of the objects. However, the type 3 arrowheads excavated were highly probable used as projectiles and not as polearm heads, due to the high amount of type 3 arrowheads excavated and the historical description of development of the siege. Several close combat assaults were made towards the castle. However, these assault were met with a counter attack from both the city and the castle and were fought outside the castle and the city (Bruch 1931,

59-62). Therefore, the deposition of polearms during these fights would occur far from the castle and not in the moat.

Conclusion

No decisive conclusion can be made during which event the military objects were deposited. Nevertheless, it can be hypothesized that the bullets were deposited during the siege, due to the high energy consuming events commenced to recover and reshaping of artillery bullets during the late middle ages in the Low Countries. As a result, it would be highly ineffective to deposit available bullets during the destruction of the castle. The high amount of arrow-projectiles does match with the proposed deposition of military material in the proposed theoretical framework and the deposition of other sieges, such as the siege of Slot op den Hoef. Therefore, it is proposed that the objects were deposited during the 12 weeks siege of the castle in 1402 and the siege method of artillery bombard was deployed.

6.1.5 Huis te Merwede

The large amount of military material excavated does support an event occurring at the castle with a higher deposition of military material. In total 13 military objects were excavated at the castle: 10 projectiles (8 arrow-projectiles and 2 bullets), 2 hand arms (1 buckler and 1 dagger), and 1 shoulder guard. Only the shoulder guard could be dated post-1375, while the rest of the objects are dated to the existence of the castle; 1300-1421. According to historical sources and myth, there are two events that can elucidate the high deposition of military objects: the siege of the castle in 1304 and the plundering of the castle 1418. Both events are linked to a siege of the city of Dordrecht, because to conquer the city the castle of Huis te Merwede had to be controlled as well, due to the distance between the two, 3 km. The castle owners supported the city of Dordrecht in 1304 and aided the besiegers of the city in 1418.

Siege 1304

The historical data on the siege of castle Huis te Merwede and the city of Dordrecht in 1304 by the troops of the Duke of Brabant is presented by the *Rijmkroniek van Holland by* Melis Stoke. Melis Stoke describes that the troops wanted to attack and split the land of Merwede (Burgers 2004, 420). However, the city and the castle were well defended and could repel the besiegers (Boer *et all* 1996, 72). During this attack the troops of the duke of Brabant used their artillery to burn parts of the city of Dordrecht (De Graaf

2004, 186). As a result of the distance between the castle and the necessity to control both, it is highly probable that cognate artillery was utilized during the siege of the castle as well.

The military material would be deposited in the moat of the first castle of Huis te Merwede. The moat of the first castle has been partly excavated, because the second castle, larger in size than the first castle, was partly build on top of the moat of the first castle, and excavated (Weijs 2011, 19).

Destruction castle 1418

The actual actions that transpired in 1418 concerning the destruction of the castle are unknown and no historical sources describe the precise events; the destruction is based on an old myth (Weijs 2011, 17; Boer *et all* 1996, 152). However, burning traces on the castle ruins manifest the, partial, destruction of the castle (oral transmission by Nieky Klaus). Two possible explanations; either the castle was destroyed by the troops of Jacoba van Beieren, in framework of burned ground tactics, or destroyed by the citizens of Dordrecht. Nevertheless, the destruction of the castle by either of these two parties, the material excavated had to be present in the castle.

Conclusion

Requisite for determining the event that inspired the deposition of these objects, is the dating, and excavation context and location of the objects. However, both datasets are problematic. Only the shoulder guard can be dated to the destruction event in 1418 of the castle, the rest of the objects can be dated to both events. The assembly of arrowheads does give some insight in the dating of the objects. The eight arrow-projectiles are composed of five type 3 arrowheads and three type 1 arrowheads. Two of the type 3 arrowheads have part of their shaft present and is possible to determine that the arrowheads were definitely used as projectiles and not as polearms. Because of the presence of artillery during the siege of the Dordrecht, there is a good possibility that the type 3 arrowheads were shot by corresponding artillery, during the siege of the castle. However, the arrowheads with shafts were not available for study. Therefore, no conclusion could be made on the device shooting the arrows and concluding the dating of the arrows. The other 3 arrowheads are all type 1 arrowheads, in line with the expected arrowheads used in 1304, insinuating the deposition of the arrows during the siege. However, three arrowheads does not provide conclusive evidence to prove a

complete siege or the deposition of the type 3 arrowheads during the same event. As stated earlier, the excavation location of the objects in the castle is essential for determining the event of the deposition of the objects. However, the excavation was performed in 1940-3. As a result, not all the objects have been completely recorded and the rest of the excavation has not been, up to now, not been worked out. Therefore, at this moment no conclusion can be made on the bases on the locations of the excavated objects. The bullets excavated, 80 and 10 mm in diameter, date later than the siege of 1304.

The three type 1 arrowheads denote to a siege of the castle 1304, while the burning marks demonstrate a large fire occurring at the castle, likely during the destruction of the castle. However, it is not possible to date type 3 arrowheads by the lack of possibility to study the arrowheads and the lack of archaeological records concerning the excavation. It is not possible to present a conclusive answer to the question what happened during both the siege of 1304 and the destruction of the castle in 1418 by using the available archaeological sources. Nevertheless, with the available information, the conclusion can be made that the arrow-projectiles were deposited during the siege of the castle in 1304. However, it is not possible to determine the precise siege methods.

6.1.6 Conclusion Theoretical framework

The military material excavated at the five examined castles clearly show that during specific events large amounts of military material is deposited, and when a siege occurs it is occasionally, depending on the military material present, to determine the siege method deployed. However, due to the lack of good dating methods, documentation on the excavation and complete excavated castles, it is not always possible to determine the precise events and gain insight into the precise differentiation in military material deposited between the three events: destruction, dismantling and siege of a castle. Thus, the theoretical framework does describe the deposition of military materials at a castle, although it is not possible to reliably differentiate between the different events using only military material.

6.2 Military role of the different castle types

Comparing the castle types and the amount of military objects excavated at the different castles a clear differentiation can be made: more military objects are excavated at square castles and at more square castles military objects are excavated (see table

6.2). The only exception is the castle Kasteel Polanen, a keep tower castle with high amounts of military objects. It is rather clear that at square more events eventuate where large amounts of military objects are deposited and when these events transpire more military objects are deposited. The question rises why at square castles more military objects were present, compared to keep towers and moated sites.

(Table 6.2: The differentiation in military objects for castles with an event and not)

Castle name	Amount of Objects	Event with heightened change deposition: Yes/no
Kasteel Polanen	32	**Yes**
Slot op den Hoef	54	**Yes**
Kasteel van Arkel	39	**Yes**
Huis te Merwede	12	**Yes**
Huis te Riviere	24	**Yes**
Slot Harnasch	1	**No**
Huis te Palenstein	3	**No**
Valkenburg (Zuid-Holland)	3	**No**

Square castles were larger structures with thicker walls and consequently were better defendable and could survive long periods of bombardments by artillery, for example the siege of Kasteel van Polanen, were only the main tower was slightly damaged during the siege. Therefore, possibly have an inherent higher military relevance than the other castle structures. However, even after draining the moat of Polanen in 1351 to recover the trebuchet bullets there were 25 trebuchet bullets not retrieved because these bullets were underneath blocks of the walls of the tower, implying an even larger amount of bullets were shot at the castle.

Denoting, whilst the castle Kasteel Polanen was a keep tower, it was possible for the castle to withstand a large amount of bullets heavy stones shot at the castle for three weeks, traditionally only expected for square castles (De Graaf 2004, 338). Concluding, that even lesser defendable structures, from a morphological perspective, were able to withstand a siege for a prolonged period against a contemporary modern army. Therefore, not only the structure is essential during a siege, but the garrison and equipment available for the garrison as well.

However, the questions rises again why lower nobility did not arm their castles with modern equipment and troops, if it is possible for them to at least survive for a

prolonged time during a siege. Two rationale elucidate the discrepancy of military material present at square castles.

The first rationale can be sought in the owners of the castles. The similarities among all castles with large amounts of military material is the standing and wealth of the castle lords during the deposition of the military objects; they are all very wealthy and powerful nobleman, compared to the castle lords of the other castles, with the means to maintain a large garrison and equipment.

The second rational can be found among the differentiation in reason to defend and especially the differentiation in degree of ferocity of the defence among nobility in Holland. Under normal circumstances when no terms were met during a siege, the war would be fought until death (Keen 1965, 121). If a town or fortress did not surrendered and was conquered it was systematically plundered and the defenders were killed (Keen 1965, 122-3). During medieval warfare, including siege warfare, personal honour for the commanders could be won or lost (Keen 1965, 132). To surrender a castle or town without a siege was treated as treason and was cowardly, the lord of a directly surrendered castles could therefore be beheaded (keen 1965, 124). Consequently, a castle had to be defended until there was a clear sign the castle could not be defended anymore. If a caption or lord of a castle made a good attempt of defending the castle it was reasonable to surrender the castle (Keen 1965, 125). A situation commenced whereby the defenders could not directly surrender their castle, but had to defend until they could surrender, while maintaining their honour. A good example is the siege of the castle of Te Gein in 1356 (see table 6.3).

(Table 6.3: Croniken van den Stichte van Utrecht ende van Hollant, describing the siege of Castle te Gein (http://objects.library.uu.nl/, 204))

Middle Dutch	English Translation
Licht een halve ure voer laghen. Doe vraghede Snoey heren Ghisebrecht, of hi den toorn so langhe gehoude hadden, dat hi ne mit eren opghegeven mochte. Haer Ghisesbrecht seide: ja. Daer op gaf hi den toorn op ende si worpe neder.	After being besieged for half an hour, Snoei asked lord Ghisebrecht if he could surrender with honour. Lord Ghisebrecht answered with yes, surrendered the castle and bowed humbly.

The sieges of the castle te Gein acted as a martial play of half hour. Possibly the castle was not in a state of readiness for a prolonged siege (De Graaf 2004, 139). It can be concluded that the defence of the castle had not to be long or ferocious to surrender with dignity. Losing a siege did not have to be destructive. A large part of the castle lords were exiled after losing a siege. However, for many lords it was possible to return back to their land and claim their old rights, called *landwinning,* after a few years (Glaudemans 2004, 281). The sanctions after losing a siege all depended on the ferocity of the defenders; the more ferocious the defenders resisted the harder the punishment. The lower nobility dragged into conflict by their feudal lords had more to gain by surrendering earlier than mounting a losing defence.

Hence, the wealthy and powerful high nobles had the finances to maintain a garrison, well equipped, to defend their castles and win the defence, while lower nobility were reluctant to attempt mounting a defence, with their limited finances, if the punishment for a ferocious defence was more severe than surrendering early. As a result, the morphological features of a castle enabled the possibilities for a defence, but essential in a defence was the garrison and the available equipment and artillery. Consequently, more military material was presence at square castles, because the castle lords were wealthier, and, therefore, more military material could be deposited during an event. While, more military material deposition events occurred at square castles because the castles were more frequently besieged using siege tactics with a higher probability of deposition of military objects, i.e. artillery bombardments and close combat assaults.

Thus, to research the military relevance of a castle, researching the wealth of a castle lord and the placement of the garrison in the castle is probably more relevant than the comparing design of a castle during the later middle ages.

6.3 Recommendations for further research

To further refine the proposed theoretical framework and gain more insight in the specific deposition events of military material to determine the difference between besieged and non-besieged castles research has to be done in the following subjects:

- The theoretical framework should be tested on more castle, especially castles with no or a low amount of material excavated and historical sources describing destruction events at the castle. As a result, it would be possible to test if the

amount of military material excavated can reliably be coupled to wealth of an castle lord, and subsequently its garrison at the castle, and destruction events.

- More castles with a larger part of the moat excavated and with better documentation on locations of the military objects within the moat have to be examined, to gain more insight in the precise actions occurring around the castle before the deposition of the military amterial took place. Only for the castle Slot op den Hoef most of the moat has been excavated and as a result it has by far the most excavated military objects. Therefore, during new excavations of castles more emphasis should be given on the moat of the castle, as well as on the location of the military material. Consequently, it is possible to determine the discrepancy between the arrows bought or transported to a siege and the actual usage of the arrows during the siege.

  An example of a castle that could be excavated to determine the differentiation between the historical and archaeological record is the castle of Rosenburch. The castle has not been excavated. However, there are excellent historical sources describing the events of the siege. Therefore, it is possible to make an excellent comparison between historical sources and archaeological remains of a siege and examine the discrepancies and similarities between the two.

- Dating typologies for military material should be improved to be able to better differentiate the deposition of the military objects between different events, by examining military objects from dated contexts and using absolute dating methods. For example contexts excavated in cities.

- To enable the better differentiation between the dismantling of a castle and a siege, more insight is needed in the precise actions occurring during the dismantling and what happens with the military objects present in the castle; are the objects claimed or destroyed? This is possible by historical research into the finances spent in restoring and rebuilding the castle after dismantling, when the old castle lord is again accepted in society.

7. Conclusion and recommendations for further research

Determining the function of castles is a topic heavily debated between scholars. However, most scholars agree there is a balance between the living and political function of a castle, and its military function. Therefore, because of this balance it is possible to study one of the two to gain insight in the complete function of the castle. Traditionally archaeological research has used outer and tower wall thickness, and historical research bills and chronicles to determine the military function of a castle. Both have their limitations, while there is another possible source for determining the military use of castle: military material.

To study this source a case-study of the military material excavated at eight castles in the county of Holland dating between 1250-1450 has been performed, to answer the question:

How is a siege visible within the excavated military material at castles in the county of Holland during the period 1250-1450, is it possible to determine the siege techniques used to besiege the castles using military material culture, and is an alternative differentiation possible between castle types using military material?

The difference between in besieged and non-besieged castle using military material is based on the assumption that during a siege more military objects were deposited than during peace. To study the deposition of military material at castles a theoretical frame work has been proposed with three evens with a heightened probability of deposition of military material: a siege of a castle, the dismantling of a castle in scorch earth tactics and the destruction of castle as punishment.

Combining the evidence of the five castles with such an events and the three castles with no events of a heightened deposition probability, it can be concluded that during sieges, and as well during the destruction and dismantling of castles, large amounts of military material were deposited, as proposed in the theoretical framework. Furthermore, it was possible to determine siege method employed using the military material; large amounts of arrow-projectiles and bullets during an artillery bombardment and polearms, hand arms and arrow-projectile during a close combat assault. However, determining the siege method is only possible if the objects deposited

during the siege can be recognised as such in the archaeological record. Conversely, it is not possible to determine the deposition event merely on the basis of excavated military material at castles; historical research is needed to determine the event.

Furthermore, there is a large difference between the amount of military material excavated at square compared to the keep towers and moated sites. Therefore, the examined military material excavated at the eight castles displayed that there is a differentiation in military role of the three castle types. However, this differentiation is not primarily induced by the difference in morphological features, as traditionally propound, but by the wealth of the castle lord owning the castle and his feasibility to defend the castle using a garrison and equipment. Lower less wealthy nobility, mainly occupying moated site or keep towers, only have their obligatory arms and armour from their feudal requirements, while, wealthier and powerful nobility, mainly occupying square castle and possibly keep towers, have more arms and armour present at their castle. Thus, it is possible to use military material as a source to gain insight in sieges and the military role for castles, but only for castles owned by wealthy lords, i.e. mostly square castles and possible keep towers.

7.1 Recommendation's for further research.

To enable to tackle the main difficulty of the proposed theoretical framework more already excavated castles, with a larger portion of the moat excavated, should be examined, or new archaeological excavations have to be done on still *in situ* castles with historical sources describing in detail the events occurring at the castle, such as castle Rosenburch. Furthermore, dating typologies should be improved to enable better linking between military material and specific events occurring at the castle. And, at last, more research has to be done into the specific actions undertaken during the dismantling of a castle and the social aspects of the dismantling, to enable a better understanding of the depositing of military material during this event.

Summary

Determining the difference in military or political function of castles is a topic heavily debated between scholars. Traditionally the military function has been studied through the use of historical documents or archaeological research into the outer and tower wall thickness of a castles. However, there is another source of material that enables to study a facet of the military functions of castles; military material to study the defence of the castle of against a siege.

To examine the possibilities of military material as a source, a case-study has been performed on the military material excavated at eight castles in the county of Holland dating between 1250-1450. The eighth studied castles were grouped into three morphological types of castles. The castle types used in the thesis, from large to small: square castles, keep towers, and moated sites.

To determine if castle was besieged using military material a theoretical framework is proposed for the deposition of military material during various events with a heightened deposition probability. The expected deposition of military objects during peace is low compared to the deposition of military objects during a siege. There is no expected pattern for the assembly of military objects deposited during peace. While, the expected loss of military objects during a siege would show a higher amount of projectiles, hand arms and polearms, depending on the siege method employed. However, during the destruction of the castle as part of the scorched earth tactic or as punishment high amount of military material is expected as well.

Examining the military material at the eight castle, it can be concluded that during sieges and the destruction of castles large amounts of military material were deposited as proposed in the theoretical framework. Moreover, it is possible to determine the siege method deployed. However, only if there can be differentiated between the destruction of a castle and a siege. Furthermore, it can be concluded that there is a differentiation in military role of the three castle types. However, this differentiation is not induced by the difference in morphological features, but by the wealth of the castle lord owning the castle and his willingness to defend the castle.

Samenvatting

Het verschil functie militaire en politieke functie van een kasteel is zwaard gedebatteerd onder wetenschapper. Traditioneel de militaire functie van een kasteel is bepaald aan de hand van historische bronmateriaal en de dikte van buiten en torenmuren. Er is echter een nog een andere bron om een aspect van de militaire functie van kastelen te onderzoeken; door middel van militair materiaal de verdediging van een kasteel tegen een belegering te onderzoeken.

Om de mogelijkheden van militair materiaal als bronmateriaal te onderzoeken een casestudy is gemaakt van het militair materiaal opgegraven bij acht kastelen in Holland gedateerd in de periode 1250-1450. De acht kastelen zijn gegroepeerd in drie typen, van groot naar klein: vierkante kastelen, woontorens en moated sites.

Om te bepalen of een kasteel belegert is geweest met militair materiaal een theoretisch kader is voorgesteld voor evenementen met een verhoogde kans op depositie van militair materiaal. De verwachte depositie van militair materiaal tijdens een vrede is laag vergeleken met de depositie van militair materiaal tijdens een belegering. Er is geen verwacht patroon voor de assemblage van militair materiaal tijdens vrede. Terwijl de verwachte depositie van militair materiaal een grote hoeveelheid projectielen, handwapens en paalwapens is, afhankelijk van de belegeringtechniek toegepast. Daarin tegen wordt er verwacht dat tijdens de destructie van een kasteel als onderdeel van de verbrande aarde tactiek of als straf ook veel militair materiaal gedeponeerd wordt.

Door het onderzoeken van het militair materiaal van de acht bestudeerde kastelen is het mogelijk te concluderen dat er tijdens belegeringen en de destructie van een kasteel veel militair materiaal gedeponeerd wordt zoals voorgesteld in het theoretisch kader. Ook is het mogelijk om de belegeringsmethode te herkennen aan de hand van militair materiaal, maar alleen wanneer er gedifferentieerd kan worden tussen de depositie evenementen. Aan de hand van het bestudeerde militair materiaal kan een differentiatie worden gemaakt voor de militaire rol van de verschillende kasteel typen. Deze differentiatie is gebaseerd op de rijkdom van de een kasteelheer en zijn bereidheid om zijn kasteel te verdedigen.

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List figures and tables

Figures

Tables

Crumbling Castles

Exploring the differentiation between besieged and non-besieged castles using military material, with a case study of eight castle in the county of Holland during the period 1250 – 1450.

Part 2: catalogue

Casper Johann van Dijk

Casper Johann van Dijk
Address: Vrijheidslaan 822
E-mail: cjvandijk1193@gmail.com
Tel. : + 31 629483187
Front Image: MS. Bodl. 264 f.255r

Table of Contents

1. Introduction

This the catalogue presenting the military objects describe in the thesis. The objects studied are stored in different depots throughout the province of Zuid- and Noord-Holland of the Netherlands (see table 1.1). The auteur has visited the different depots to examine the objects. This examination consisted of measuring different parts of the objects for further comparison and photographing the object if no earlier photograph of the object was available. The photos made or used in this catalogue is done with the permission of the respective organisation storing the specific objects.

(Table 1.1: Location of the objects stored per castle)

Castle Name	*Storage location*
Slot op den Hoef	Provinciaal Archeologisch Depot Noord-Holland
Huis te Riviere	Provinciaal Archeologisch Depot Zuid-Holland
Polanen	Provinciaal Archeologisch Depot Zuid-Holland
	Westlandsmuseum
Kasteel van Arkel	*Archeologisch Gemeentelijk depot Gorinchem*
Huis te Merwede	Archeologisch Gemeentelijk depot Dordrecht
Valkenburg (Zuid-Holland)	Archeologisch Gemeentelijk depot Delft
Slot Harnasch	Archeologisch Gemeentelijk depot Delft
Huis te palenstein	Historisch genootschap Oud Zoetermeer

In total 165 objects from eight castles where studied. The objects are presented per castle and per category and subcategory in different chapters of this catalogue, with each chapter presenting the material excavated of a specific castle. If no data or a no photo is available for a specific object or various objects this is mentioned at the beginning of each chapter. The dating presented in the catalogue is either based on typological or context dating, as explained in the thesis. If a typological dating is used the first literature reference is to the specific typology and page number the dating is based on, while the second reference to excavation rapport the object is mentioned in.

For the subcategories arrow-projectile and bullet additional information is presented. For arrow-projectile the socket diameter and the arrowhead style are presented and for

the subcategory bullet the weight and diameter are presented, both under the numbers 7 and 8. If a line is empty the specific data is not available for that object. If no photo was available the sentence (No photo available) is presented.

For each object the following general information is presented:

1. Object number as used in the thesis
2. Object number as used in the depot
3. Category as defined in the thesis
4. Subcategory
5. Context dating
   Typological dating
6. Literature of the typological dating
   Excavation report mentioning object
7. Type of arrowhead as defined in the thesis
   Weight Bullet
8. Diameter of the socket of the arrowhead
   Diameter bullet

Unfortunately, because part of the photographs were provided by a third party it is not possible to present the photographs on a scale.

2. Slot op den Hoef

The photographs of the objects excavated at Slot op den Hoef are stored online. However, through the updating the database it was not possible to acquire all photo's at this moment.

2.1 Pole arms

1.	1057
2.	5009-15
3.	Polearm
4.	Pike head
5.	1206 – 1573
6.	

(No photo available)

1.	1060
2.	5009-15
3.	Polearm
4.	Pike head
5.	1206 – 1573
6.	

1.	1061
2.	5009-7
3.	Polearm
4.	Pike head
5.	1206 – 1573
6.	

1.	1062
2.	5009-6
3.	Polearm
4.	Pike head
5.	1206 – 1573
6.	

1.	1063
2.	5009-9
3.	Polearm
4.	Pike head
5.	1206 – 1573
6.	

1.	1134
2.	5001-33
3.	Polearm
4.	Pole axe head
5.	1206 – 1573
6.	

1. 1183
2. 5009-042
3. Polearm
4. Pike head
5. 1206 – 1573
6.

(No photo available)

1. 1185
2. 5016-001
3. Polearm
4. Tournament Point
5. 1206 – 1573
6.

(No available)

1. 1190
2. 5009-021
3. Polearm
4. Pike head
5. 1206 – 1573
6.

(No available)

1. 1193
2. 5009-033
3. Polearm
4. Pike head
5. 1206 – 1573
6.

(No available)

1. 1195
2. 5024-001
3. Polearm
4. Pole axe head
5. 1206 – 1573
6.

1. 1198
2. 5002-109
3. Polearm
4. Pike head
5. 1206 – 1573
6.

(No photo available)

1. 1199
2. 5002-108
3. Polearm
4. Pike head
5. 1206 – 1573
6.

2.2 Hand arms

2.2.1 Dagger

(No photo available)

1. 1084
2. 5009-24
3. Hand arm
4. Dagger
5. 1206-1573
6.

1. 1122
2. 5002-84
3. Hand arm
4. Dagger
5. 1206 – 1573
   1450 –
6. Puype and Stevens 2010, 158-61

1. 1124
2. 5009-19
3. Hand arm
4. Dagger
5. 1206-1573
6.

1. 1125
2. 5009-17
3. Hand arm
4. Dagger
5. 1206-1573
6.

(No photo available)

1. 1126
2. 5009-35
3. Hand arm
4. Dagger
5. 1206-1573
6.

(No photo available)

1. 1127
2. 5009-36
3. Hand arm
4. Dagger
5. 1206-1573
6.

1. 1128
2. 5009-40
3. Hand arm
4. Dagger
5. 1206 – 1573
   1300 – 1500
6. Puype and Stevens 2010, 158-61

1. 1182
2. 5002-069
3. Hand arm
4. Dagger
5. 1206-1573
6.

(No photo avaible)

1. 1186
2. 5009-069
3. Hand arm
4. Dagger
5. 1500 –
6. Puype and Stevens 2010, 158-61

(No photo available)

1. 1189
2. 5009-034
3. Hand arm
4. Dagger
5. 1206-1573
6.

(No photo available)

1. 1192
2. 5009-036
3. Hand arm
4. Dagger
5. 1206-1573
6.

1. 1194
2. 5040-57
3. Hand arm
4. Dagger
5. 1206-1573
6.

2.2.2 Swords

(No photo Available)

1. 1048
2. 5009-10
3. Hand arm
4. Sword
5. 1206 – 1573
   1250 – 1500
6. Oakeshott 1991, 128

1. 1129
2. 5009-2
3. Hand arm
4. Sword
5. 1206 – 1573
   1500 –
6. Seitz 1982, 400

1.	1131
2.	5009-29
3.	Hand arm
4.	Sword
5.	1206 – 1573
	1450 –
6.	Seitz 1982, 355

1.	1132
2.	5018-9
3.	Hand arm
4.	Sword
5.	1500 – 1600
6.	Seitz 1982, 400

1. 1188
2. 5025-003
3. Hand arm
4. Sword
5. 1206 – 1573
   1475 – 1600
6. Puype and Stevens, 148-155

1. 1191
2. 5025-001
3. Hand arm
4. Sword
5. 1206-1573
6.

2.3 Projectiles

2.3.1 Arrow-projectiles

1.	1065
2.	5002-90
3.	Projectiles
4.	Arrow-projectiles
5.	1206-1573
6.	
7.	Type 1
8.	6 mm

1.	1066
2.	5002-91
3.	Projectiles
4.	Arrow-projectiles
5.	1206-1573
6.	
7.	Type 1
8.	11 mm

1.	1067
2.	5002-98
3.	Projectiles
4.	Arrow-projectiles
5.	1206-1573
6.	
7.	Type 1
8.	7 mm

1.	1068
2.	5002-88
3.	Projectiles
4.	Arrow-projectiles
5.	1206-1573
6.	
7.	Type 1
8.	

1.	1069
2.	5002-107
3.	Projectiles
4.	Arrow-projectiles
5.	1206-1573
6.	
7.	Type 1
8.	

1.	1070
2.	5002-97
3.	Projectiles
4.	Arrow-projectiles
5.	1206-1573
6.	
7.	Type 1
8.	9 mm

1.	1071
2.	5002-110
3.	Projectiles
4.	Arrow-projectiles
5.	1206-1573
6.	
7.	Type 1
8.	

1.	1072
2.	5002-89
3.	Projectiles
4.	Arrow-projectiles
5.	1206-1573
6.	
7.	Type 1
8.	

1.	1073
2.	5002-85
3.	Projectiles
4.	Arrow-projectiles
5.	1206-1573
6.	
7.	Type 1
8.	

1.	1085
2.	5002-105
3.	Projectiles
4.	Arrow-projectiles
5.	1206-1573
6.	
7.	Type 1
8.	6 mm

1.	1086
2.	5002-87
3.	Projectiles
4.	Arrow-projectiles
5.	1206-1573
6.	
7.	Type 1
8.	

1.	1087
2.	5002-103
3.	Projectiles
4.	Arrow-projectiles
5.	1206-1573
6.	
7.	Type 1
8.	9 mm

1.	1088
2.	5002-104
3.	Projectiles
4.	Arrow-projectiles
5.	1206-1573
6.	
7.	Type 1
8.	

1.	1089
2.	5002-106
3.	Projectiles
4.	Arrow-projectiles
5.	1206-1573
6.	
7.	Type 1
8.	

1.	1187
2.	5002-102
3.	Projectiles
4.	Arrow-projectiles
5.	1206-1573
6.	
7.	Type 1
8.	

1.	1196
2.	5002-004
3.	Projectiles
4.	Arrow-projectiles
5.	1206-1573
6.	
7.	Type 2
8.	

2.3.2 Bullets

(No Photo available)

1. 1113
2. 5021-4
3. Projectiles
4. Bullet
5. 1206-1573
6.
7. 1.809 kg
8. 7.7 cm

(No Photo available)

1. 1114
2. 5014-2
3. Projectiles
4. Bullet
5. 1206-1573
6.
7. 1.306 kg
8. 7 cm

(No Photo available)

1. 1115
2. 2897-3
3. Projectiles
4. Bullet
5. 1206-1573
6.
7. 0.64 kg
8. 8 cm

(No Photo available)

1. 1116
2. 2897-2
3. Projectiles
4. Bullet
5. 1206-1573
6.
7. 0.978 kg
8. 11 cm

2.3.3 Armour

1. 1184
2. 5001-16
3. Armour
4. Visor
5. 1206 – 1573
6.

2.4 Other

(No photo available)

1. 1135
2. 5017-7
3.
4. Rear loader
5. 1206 – 1573
   1450 – 1700
6. DeVries and Smith 2005, 276

3 Huis te Riviere

3.1 Hand arm

3.1.1 Dagger

1.	1001
2.	
3.	Hand arm
4.	Dagger
5.	1260 – 1574
	1450-1574
6.	Puype and Steven 2010, 198

1.	1016
2.	
3.	Hand arm
4.	Dagger
5.	1260 – 1574
	1550 - 1650
6.	Seitz 1982, 374

1.	1017
2.	
3.	Hand Arm
4.	Dagger
5.	1550 – 1600
6.	Seitz 1982, 376

3.1.2 Sword

1.	1002
2.	
3.	Hand Arm
4.	Sword
5.	1260 – 1574
	1450 – 1560
6.	Oakeshott 1991, 215

3.2 Projectile

3.2.1 Arrow-projectile

1.	1011
2.	
3.	Projectile
4.	Arrow-projectile
5.	1260 – 1574
6.	
7.	10
8.	Other

1.	1012
2.	
3.	Projectile
4.	Arrow-projectile
5.	1260 – 1574
6.	
7.	
8.	Type 2

1.	1013
2.	
3.	Projectile
4.	Arrow-projectile
5.	1260 – 1574
6.	
7.	
8.	Other

1.	1014
2.	
3.	Projectile
4.	Arrow-projectile
5.	1260 – 1574
6.	
7.	
8.	Type 3

1.	1015
2.	
3.	Projectile
4.	Arrow-projectile
5.	1260 – 1574
6.	
7.	
8.	Type 2

1.	1018
2.	
3.	Projectile
4.	Arrow-projectile
5.	1260 – 1574
6.	
7.	
8.	Shaft

3.2.2 Bullet

1.	1005
2.	
3.	Projectile
4.	Bullet
5.	1260 – 1574
6.	
7.	0.299 kg
8.	6.2 cm

1.	1006
2.	
3.	Projectile
4.	Bullet
5.	1260 – 1574
6.	
7.	0.393 kg
8.	11 cm

1.	1007
2.	
3.	Projectile
4.	Bullet
5.	1260 – 1574
6.	
7.	1.522 kg
8.	11 cm

1.	1008
2.	
3.	Projectile
4.	Bullet
5.	1260 – 1574
6.	
7.	0.269 kg
8.	6.1 cm

1.	1009
2.	
3.	Projectile
4.	Bullet
5.	1260 – 1574
6.	
7.	1.422 kg
8.	10.7 cm

1.	1019
2.	
3.	Projectile
4.	Bullet
5.	1260 – 1574
6.	
7.	2.03 kg
8.	12.2 cm

1.	1020
2.	
3.	Projectile
4.	Bullet
5.	1260 – 1574
6.	
7.	0.371 kg
8.	7.9 cm

1.	1021
2.	
3.	Projectile
4.	Bullet
5.	1260 – 1574
6.	
7.	0.419 kg
8.	6.7 cm

3.3 Other

1.	1003
2.	
3.	
4.	Cannon Barrel
5.	1260 – 1574
	1450 – 1700
6.	DeVries and Smith 2005, 276
	Renaud 1955, 135

1.	1049
2.	32481
3.	
4.	Cannon Barrel
5.	1450 – 1700
6.	DeVries and Smith 2005, 276

1. 1004
2.
3.
4. Rear loader
5. 1260 – 1574
   1450 – 1700
6. DeVries and Smith 2005, 276

1. 1022
2.
3.
4. Rear loader
5. 1260 – 1574
   1450 – 1700
6. DeVries and Smith 2005, 276

1. 1023
2.
3.
4. Rear loader
5. 1260 – 1574
   1450 – 1700
6. DeVries and Smith 2005, 276

1. 1024
2.
3.
4. Rear loader
5. 1260 – 1574
   1450 – 1700
6. DeVries and Smith 2005, 276

4 Polanen

Because three bullets excavated at Polanenwere part of an exhibition and the rest of the 22 bullets were situated in the garden of the museum, it was impossible to make good measurements of the bullets and take photos of sufficient quality. Therefore, the bullets are not presented in this catalogue. Furthermore, because the objects were stored in two locations the add on WLM, by the depot obj. code, references to Westland museum, while the add on Prov.Arch. ZH referces to Provinciaal Archeologisch Depot Zuid-Holland.

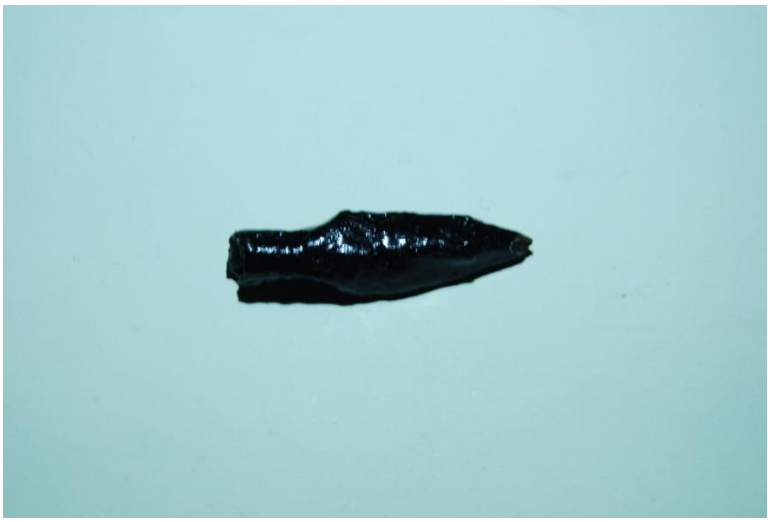
4.1 Projectiles

4.1.1 Arrow-projectiles

1.	1050
2.	Prov.Arch. ZH 22594
3.	Projectile
4.	Arrow – projectile
5.	1295 – 1393
6.	
7.	Type 1
8.	

1.	1051
2.	Prov.Arch. ZH 22594
3.	Projectile
4.	Arrow – projectile
5.	1295 – 1393
6.	
7.	Type 3
8.	20 mm

1.	1161
2.	WLM
3.	Projectile
4.	Arrow – projectile
5.	1295 – 1393
6.	
7.	Other
8.	18 mm



1.	1162
2.	WLM
3.	Projectile
4.	Arrow – projectile
5.	1295 – 1393
6.	
7.	Other
8.	8 mm

1.	1163
2.	WLM
3.	Projectile
4.	Arrow – projectile
5.	1295 – 1393
6.	
7.	Type 3
8.	26 mm

1.	1164
2.	
3.	Projectile
4.	Arrow – projectile
5.	1295 – 1393
6.	
7.	Type 1
8.	

1.	1197
2.	
3.	Projectile
4.	Arrow – projectile
5.	1295 – 1393
6.	
7.	Type 3
8.	22 mm

5 Kasteel van Arkel

Eight bullets excavated at the castle Kasteel van Arkel were not present at the storage depot during the examinations of the other objects. Therefore, they are not photographed and examined. However, from the other seven bullets that were available for study, no photographs were taken because the bullets were too large to move and were not at an optimal location to be photographed.

5.1 Projectiles

5.1.1 Arrow-projectiles

1.	1074
2.	Kb 96 vo5-m23
3.	Projectile
4.	Arrow-projectile
5.	1267 – 1412
6.	
7.	Type 3
8.	

1.	1075
2.	Kb401 m14
3.	Projectile
4.	Arrow-projectile
5.	1267 – 1412
6.	
7.	Type 2
8.	

1.	1076
2.	Kb-05 m21
3.	Projectile
4.	Arrow-projectile
5.	1267 – 1412
6.	
7.	Type 2
8.	

1.	1077
2.	Kb-01 m03
3.	Projectile
4.	Arrow-projectile
5.	1267 – 1412
6.	
7.	Type 3
8.	

1. 1078
2. Kb96 v02-m13
3. Projectile
4. Arrow-projectile
5. 1267 – 1412
6.
7.
8.

1. 1079
2. Kb 96 v10-m02
3. Projectile
4. Arrow-projectile
5. 1267 – 1412
6.
7. Type 2
8. 9 mm

1.	1180
2.	Kb 96 v5-m03
3.	Projectile
4.	Arrow-projectile
5.	1267 – 1412
6.	
7.	Typ 2
8.	10 mm

1.	1181
2.	Kb96 v01-m06
3.	Projectile
4.	Arrow-projectile
5.	1267 – 1412
6.	
7.	Other
8.	14 mm

1.	1182
2.	Kb96 v07-m13
3.	Projectile
4.	Arrow-projectile
5.	1267 – 1412
6.	
7.	Other
8.	8 mm

1.	1183
2.	Kb-07 m19
3.	Projectile
4.	Arrow-projectile
5.	1267 – 1412
6.	
7.	Other
8.	

1.	1092
2.	Kb96 04-m01
3.	Projectile
4.	Arrow-projectile
5.	1267 – 1412
6.	
7.	Type 2
8.	12 mm

1.	1093
2.	Kb96 04-m02
3.	Projectile
4.	Arrow-projectile
5.	1267 – 1412
6.	
7.	Type 2
8.	11 mm

1.	1094
2.	
3.	Projectile
4.	Arrow-projectile
5.	1267 – 1412
6.	
7.	Type 3
8.	20 mm

(No picture Available)

1.	1095
2.	Kb96 v07-m02
3.	Projectile
4.	Arrow-projectile
5.	1267 – 1412
6.	
7.	Other
8.	

1.	1096
2.	Kb96 n01-m03
3.	Projectile
4.	Arrow-projectile
5.	1267 – 1412
6.	
7.	Type 3
8.	

1.	1097
2.	Kb96 v01-m01
3.	Projectile
4.	Arrow-projectile
5.	1267 – 1412
6.	
7.	Type 3
8.	22 mm

1.	1098
2.	Kb96 v05-m01
3.	Projectile
4.	Arrow-projectile
5.	1267 – 1412
6.	
7.	Type 3
8.	18 mm

1.	1099
2.	Kb96v01-m02
3.	Projectile
4.	Arrow-projectile
5.	1267 – 1412
6.	
7.	Type 3
8.	20 mm

1.	1100
2.	Kb96 v02-m01
3.	Projectile
4.	Arrow-projectile
5.	1267 – 1412
6.	
7.	Type 1
8.	12 mm

1.	1101
2.	Kb96 07-m01
3.	Projectile
4.	Arrow-projectile
5.	1267 – 1412
6.	
7.	Type 2
8.	

1.	1102
2.	Kb96 v01-m07
3.	Projectile
4.	Arrow-projectile
5.	1267 – 1412
6.	
7.	Type 1
8.	10 mm

1.	1103
2.	Kb96 v01-m04
3.	Projectile
4.	Arrow-projectile
5.	1267 – 1412
6.	
7.	Other
8.	

1.	1104
2.	Kb96 v01-m05
3.	Projectile
4.	Arrow-projectile
5.	1267 – 1412
6.	
7.	Type 3
8.	

5.1.2 Bullets

(Photo not available)

1. 1167
2.
3. Projectile
4. Bullet
5. 1267 – 1412
6.
7. 45 kg
8. 31 cm

(Photo not available)

1. 1168
2.
3. Projectile
4. Bullet
5. 1267 – 1412
6.
7. 80 kg
8. 40 cm

(Photo not available)

1. 1169
2.
3. Projectile
4. Bullet
5. 1267 – 1412
6.
7. 18.5 kg
8. 26 cm

(Photo not available)

1. 1171
2.
3. Projectile
4. Bullet
5. 1267 – 1412
6.
7.
8. 12 cm

(Photo not available)

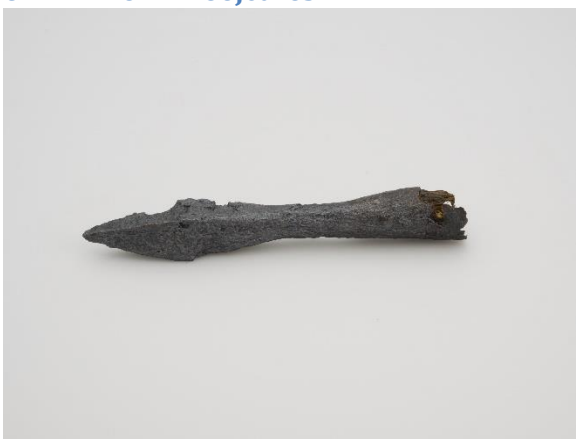
1.	1172
2.	
3.	Projectile
4.	Bullet
5.	1267 – 1412
6.	
7.	
8.	15 cm

6 Huis te Merwede

Two arrow-projectiles with shaft excavated at Huis te Merwede were part of an exhibition and were therefore not available for examination. As a result, only a picture of the two arrow-projectiles will be shown.

6.1 Projectiles

6.1.1 Arrow-Proejctiles



1.	1033
2.	8364
3.	Projectile
4.	Arrow-projectile
5.	1300 – 1418
6.	
7.	Type 3
8.	22 mm

1.	1034
2.	8364A
3.	Projectile
4.	Arrow-projectile
5.	1300 – 1418
6.	
7.	Type 3
8.	19 mm

1.	1035
2.	8375A
3.	Projectile
4.	Arrow-projectile
5.	1300 – 1418
6.	
7.	Type 1
8.	6 mm

1.	1036
2.	8375B
3.	Projectile
4.	Arrow-projectile
5.	1300 – 1418
6.	
7.	Type 1
8.	10 mm

1.	1037
2.	8375C
3.	Projectile
4.	Arrow-projectile
5.	1300 – 1418
6.	
7.	Type 1
8.	

1.	1038
2.	8363
3.	Projectile
4.	Arrow-projectile
5.	1300 – 1418
6.	
7.	Type 3
8.	20 mm

One of the *Quereels* that was not available for study

6.1.2 Bullet

(Photo not available)

1.	1054
2.	8227
3.	Projectile
4.	Bullet
5.	1300 – 1418
6.	
7.	1.043 kg
8.	10 cm

(Photo not available)

1.	1055
2.	8368
3.	Projectile
4.	Bullet
5.	1300 – 1418
6.	
7.	0.514 kg
8.	10 cm

6.2 Hand arm

5.2.1 Dagger

1.	1039
2.	
3.	Hand arm
4.	Dagger
5.	1300 – 1418
6.	

1.	1040
2.	ZN-40
3.	Hand arm
4.	Buckler
5.	1300 – 1418
6.	

6.3 Armour

1.	1041
2.	
3.	Armour
4.	Schoulder guard
5.	1300 – 1418
	1375 – 1450
6.	Blair 1958, 62-3

7 Valkenburg (Zuid-Holland)

7.1 Armour

1.	1052
2.	
3.	Armour
4.	Chest piece
5.	1300 – 1400
6.	Bult and Hallewas 1990, 194

1.	1053
2.	
3.	Armour
4.	Shoulder guard
5.	1300 – 1400
6.	

8 Slot Harnasch

8.1 Projectile

8.1.1 Arrow-projectile

1.	1200
2.	
3.	Projectile
4.	Arrow-projectile
5.	1300 - 1400
6.	
7.	10 mm
8.	Type 2

9 Huis te Palenstein

9.1 Handarm

9.1.1 Dagger

1.	1025
2.	
3.	Hand arm
4.	Dagger
5.	1300 – 1400
	1375 – 1400
6.	Puype and Stevens 2010, 171
	Hacquebard *et all* 1993, 82

9.2 Projectile

9.2.1 Bullet

1.	1026
2.	
3.	Projectile
4.	Bullet
5.	1375-1500
6.	Dullaart *et all* 1993, 114
7.	1.99 kg
8.	12 cm

1.	1027
2.	
3.	Projectile
4.	Bullet
5.	1375-1500
6.	
7.	1.52 kg
8.	11 cm

9.3 Armour

1.	1028
2.	
3.	Armour
4.	Mail rings
5.	1375-1500
6.	