# Fields of Glory or Fields of Gory?

The emergence of conflict archaeology as an academic discipline and its influence on current archaeological research

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**Acknowledgements**

Shortly after starting my academic studies at the University in Leiden in 2005 I heard about the founding of the Centre of conflict archaeology in Glasgow. I had chosen to study the archaeology of Egypt, but I have also had a life-long fascination for military culture and military history. Therefore I chose to specialise myself as a conflict-archaeologist. I started to study the relevant literature and tried to read the newest articles on the subject. Because no professional conflict archaeology currently exists in the Netherlands I decided to write my thesis on Conflict Archaeology. This would enable me to combine my interest in the subject and my intensive literature study on the subject with a further specialisation in the general sub-discipline of conflict archaeology. I have visited a lot of institutes, museums and historical battlefields and I have really enjoyed writing this thesis. It is the basis for my future research in the field of conflict archaeology, the culmination of two and a half years of intensive work and I am personally very satisfied with the result.

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## Introduction

*"Don't ignore the yesterdays of war in your study of today and tomorrow"*

- Douglas Southall-Freemen

These words were spoken by historian Douglas S. Freemen at a lecture for the recruits of the United States Marine Corps school in Virginia, 1950. In his speech to the recruits Southall-Freeman tried to stress the importance of the lessons that can be learnt by the study of war in the past. The study of war in the past holds answers to modern military affairs as well as issues which go beyond the battlefield. War is not only the domain of the soldiers or the civilians which are tied up in an armed conflict themselves, but it is also the domain of historians, sociologists, anthropologists, archaeologists and other academic scholars. War and violence are among the most universal types of human behaviour, occurring everywhere around the world at macro and micro-level and throughout the entire human history, from the Palaeolithic up to the present day. According to Winston Churchill battles are the punctuation marks of history (quoted by Lynch & Cooksey 2007, 19). When studying the past, one will quickly come to the conclusion that a world without violence, war and conflict simply did never exist. David Saul states that the history of the world is primarily shaped by war (Saul 2009, 8).

It is therefore remarkable that the specific study of warfare and conflict as an independent subject in the field of archaeology has only developed in the last three decades. War, conflict and violence have been studied however within several fields of archaeology like Classical archaeology and Prehistoric Archaeology, but they have been placed in a limited temporal or spatial context related to their specific fields of study. Warfare has mainly been regarded as a social process in archaeology, a by-product of human actions at a particular archaeological site or in a certain area. It has mainly been studied by historians studying maps and texts, while archaeologists only recognized the presence of war and conflict by the presence of weapons or destruction layers in the archaeological record. Specialists from other fields have significantly contributed to the study of conflict and archaeology, like Dr. Jonathan Shay, who wrote interesting books about combat trauma in Classical Greece (Shay 1994; Shay 2002). The social impact of conflict, its exact material depositions and its importance to military history have however not been regarded as independent subjects within the field of archaeology.

Conflict archaeology as a discipline started to develop in the mid-eighties at several archaeological sites and it slowly developed toward becoming a significant field of study within the field of archaeology. In the late nineties the development of conflict archaeology made a big leap forward and within a decade it has become an integrated and independent field of research. It a relatively short time the 'rise of conflict archaeology' seems to have influenced the paradigm of archaeological research. In this thesis I will mainly try to research how conflict-archaeology has developed and in which way it has affected and changed the paradigm of archaeological research within the last three decades.

In order to achieve this goal a development and definition of conflict-archaeology will be given. Throughout the thesis critique on the subject will be discussed as well. Existing theories will be assessed during the course of the thesis. By studying literature written by the leading experts in their proper fields as well as recent literature on the subject the current status of conflict archaeology within the field of archaeology can be determined. The diversity, inter-disciplinarily and applications of conflict archaeology will be investigated by exploring the different kinds of data-sources and sub-disciplines of conflict archaeology. The development of these sub-disciplines will be discussed, assessing their importance by determining their contribution to the field of conflict archaeology. The methods and techniques which are applied will also be analysed, using case-studies as examples to determine their practical effectiveness. By highlighting several case-studies within their respective sub-discipline of conflict archaeology current issues and research will be discussed as well.

This research will aim to illustrate how conflict archaeology has influenced the study of archaeology and military history and which possible changes it has introduced in the field of archaeology. It will also define conflict archaeology and its concepts and examine and evaluate the position of conflict archaeology as a discipline within the field of archaeology. Another aim of this research is to provide thoughts for discussion and ideas for future work in the field of conflict archaeology. Several appendices have been added containing research and additional information which is either too elaborate or too descriptive to be directly included in this research. They aim to further illustrate the topics and subjects which are discussed in this thesis. In the end it should provide a solid idea of what conflict archaeology is and what its importance is to the study of archaeology in general.

# Chapter 1: The origins of War: the rise of Conflict Archaeology

*"War is the fate of mankind, the inevitable destiny of nations."*

- Colmar von der Goltz

Many things have been written about armed conflict and war throughout the ages. Some writers and thinkers have tried to illustrate that war is part of human nature. Others tried to prove the opposite, stressing the peaceful nature of mankind. Until the nineteenth century the study of prehistory had only provided fragmentary data about life in the past which created an almost unlimited scope of interpretation for this period (Veit 2002, 132). Archaeologists have held on to the eighteenth century 'noble savage' idea posed by Jean-Jacques Rousseau until recently (Renfrew & Bahn 2004, 218). Rousseau (1712-1778), according to the ideas of the Enlightenment, believed that human beings are peaceful in nature and that they are led by natural laws and emotions (Keeley 1996, 6). The Enlightenment-thinking has from then on been used as a basis for the major currents of military thought up to the present (Gat 1989, IX).

Recent studies in the field of anthropology and conflict archaeology have radically changed this idea and they tend to partially confirm and connect with the theories of Thomas Hobbes (1588-1679), of which Rousseau was a critic. Hobbes believed that mankind lived in a continual state of fear, living short and brutish lives. He believed that men were created as equals with both will or desires and prudence, the ability to learn from experience. Similar desires however create the need to have a winner, while intelligence tells an individual to not be the loser. This way an individual will try to remove obstacles that can impede his will and thus threaten his 'liberty.' In turn this would lead to conflicts escalating in a war of every man against every man (Keeley 1996, 5). According to Hobbes, prehistoric man thus lived in a natural state of war. Archaeology provides indications that since the emergence of the earliest hominids, about two million years ago, aggression and violence have been integral, universal parts of human nature (Wyse & Winkleman 1988, 44). Appendix A further deals with the development of early warfare and prehistoric conflict, illustrating the potential of the study of conflict which is present within the field of prehistoric archaeology and the influences from anthropology needed to understand conflict.

## 1.1 The conflict between war and conflict

The main focus of conflict archaeology is armed violent conflict, especially war and warfare. War and conflict are however two different things, although they are both results of competition. First of all the meaning of the concepts of conflict and war should be defined. Conflict refers to a situation in which an individual or group of organisms is engaged in conscious opposition to one or more other identifiable individuals or groups of organisms because both of them are pursuing incompatible goals. It is a product of competition, the striving for superiority in a quality which results in a struggle between opposing forces over differing opinions and desires. Conflict and competition are present on many levels of society. Some examples: conflict between mother and embryo, between parents and offspring (e.g. generation gap), sibling rivalry, sex conflicts (battle of the sexes), inter-sex conflicts and inter-group conflicts (racial, tribal, ideological etc.) (Van der Dennen 1995, 12). Herman Kahn (1922-1983) recognised forty-four stages of conflict, ranging from simple disagreements and institutionalised conflict to all-out absolute war (Lider 1979, 110; Kahn & Schelling 2010). In his opinion war is an extreme form of initial conflict and competition.

Although competition and conflict work towards a violent situation, they do not directly have to result in violent actions. A non-violent form of conflict is so-called scramble competition, a game in which teams or individuals try to compete without a direct involvement of fighting and struggle. An easter-egg hunt is a good example. Whenever struggle or fighting do actually erupt, one should speak of contest competition (after Van der Dennen 1995, 14). In many small scale or pre-state societies, pre-arranged and formalised mock-battles take place. Two groups of warriors often fire missiles at each other which they try to dodge. When one of the warriors is hit or when one side breaks, the battle is over. These fights may be fought to solve disputes, but can also function to release anger, fear, personal stress or tensions between groups. War can be seen as a form of conflict, which in turn is a form of competition.

War is one of the most visible and dramatic expressions of conflict. According to most theoretical literature 'war' in the most strict sense is "*an armed conflict between nations and states or between groups within the same state*" or "*a strife between nations, conducted by force."* These definitions are taken from the definition of Oppenheim, who stated that: "*War is a contention between two or more states through their armed forces, for the purpose of overpowering each other and imposing such conditions of peace as the victor pleases*" (Oppenheim 1912, 60). When using similar definitions 'war' is always referred to as being fought between nations or states. Several authors claim that this

would mean that the first recorded wars were fought with the rise of the city-states and the associated fully articulate armies in Bronze Age Sumer, around the 2700 BC (Gabriel & Metz 1991, 2; Saul 2009, 8). The concept of the 'city-state' is widely applied in archaeology from the nineteenth century onward to refer to the independent cities and their surrounding territories in the ancient Near East and the Classical world. It is however a modern idea reflected on the past. Another modernist concept similar to it is the 'nation-state,' an idea that was developed during the eighteenth and nineteenth centuries after the French Revolution and which is now reflected on the past (Díaz-Andreu 2010, 433). Using concepts like city- and nation-states in the definition of war and warfare is thus undesirable.

War is thus an extreme of violence. Malinoskwi makes an important distinction between individual, spontaneous acts of violence and organised collective fighting. War in his eyes is: "*...an armed contest between two independent political units, by means of organized military force, in the pursuit of a tribal or national policy* "(Malinowski 1941, 523). War seems to be based on a form of social organisation. The development of central governing institutions and the associated administrative apparatus makes it possible to create relatively manageable military structures needed to wage organised combat (Gabriel & Metz 1991, 2). War is thus often fought under the command of a social leader or the social elite (Leblanc & Register 2003, 191). The organized character of war does not mean that war is always fought according to specific conventions or agreements. Dinstein underlines the difference of the material and technical sense of war. War in the material sense is undertaken regardless to any formal steps, while war in its technical sense is fought according to certain laws and formal agreements (Dinstein 2011, 9).

In a less strict point of view, 'war' in is nothing more than a purposeful, violent and organised method which aims at the advancement of ambitions, resolving disputes and the achievements of goals set by a collective social body or group. These goals are often achieved by armed combat, the engaging in a battle or contest. This makes war an extremely violent form of competition and it is obvious that competition and the struggle for survival, e.g. food, resources and territory, is as old as humanity itself and took place long before the rise of nations. Prehistoric conflict may thus also be studied as a form of warfare for example.

Just like conflict in general, war is a form of violent armed competition. War is in fact an extreme form of conflict, but it distinguishes itself from other forms of conflict by the level of social organisation of the parties engaged in conflict or competition with each other and their opposing goals or ambitions. A war can be fought between two nations, but also between clans or tribes. When violent conflict is undertaken against an unarmed group or a party which remains largely passive and which does not directly oppose the violent party or which lacks the means of social organisation one should not speak of 'war.'

Karl von Clausewitz stated that military history has been dominated by 'civilised' warfare, organised warfare between political factions or states (after Monks & Osgood 2000, 4). The opposite of this 'civilised' war would then be 'uncivilised' war which is fought below the state-level. In the study of military history, the subject of violent conflict and warfare in non-literate pre-state level societies is often referred to as 'primitive war' (Van der Dennen 1995, 1). Primitive war is regarded to be the first stage in the history of conflict (Lider 1979, 127). According to Keeley this kind of war is characterised by a lack of organisation of manpower and logistics, organised training of units, command and control organisation, specialised weaponry, fortifications, tactics, principles of war and military specialisation (Keeley 1996, 11). Primitive warfare thus seems to be characterised by a general absence of organisation.

Malinowski recognises the highest state of violence as: wars among culturally differentiated groups as instrument of national policy (Malinowski 1941, 523). Civil wars can be recognised too as an earlier stage: warfare for early nationalism, a tribe-nation or state. The earliest forms of violence recognised by Malinowski are: fighting within groups as a breach of custom, collective and organised fighting between groups of larger cultural entities and armed raids (Malinowski 1941, 541; Lider 1979, 127). Malinowski makes no distinction between 'primitive' or 'civilised' warfare, only between the scale and organisation of the actors involved. Kahn recognises institutionalised conflict on his escalation ladder (Lider 1979, 110). Unorganised conflict would be the opposite thereof. It may then be better to speak of 'non-institutionalised' or 'pre-state' conflict instead of 'primitive' conflict.

## 1.2 The Origins of Warfare

With the distinction between conflict and war being made it becomes possible to study the causes of war and conflict. Social anthropology can be used to answer this question, although multiple approaches may be used to look for this answer. Discussing every possible approach to understanding violence, conflict and warfare would be impossible and it goes beyond this particular research Therefore only a very small example will be given, which should give an insight into the social anthropological approach of understanding violence, conflict and warfare.

There are several basic approaches to understanding the origins of warfare, recognised by several sources like Lider, McCartney and Malinowski (Lider 1979; Malinowski 1941, 523; McCartney 2006, 100). These are:

- The biological approach
- The cultural approach
- The materialist approach

More approaches can be applied, like the psychological approach used by Lider (Lider 1979, 7).

The biological approach is based on two assumptions (Lider 1979, 6). The law of the survival of life, which is based on Darwin's idea of the survival of the fittest and the concept of the nature of man, who is driven to struggle and war by instinct. Human behaviour is determines by aggressive drives developed through the process of natural selection, with war being an expression thereof. According to the biological approach organisms try to maximise their reproductive success and compete for resources which are necessary to achieve this goal. These resources are mainly territory and mates. The aggression which is then displayed is seen as a result of natural selection in order to gain these resources (McCartney 2006, 100). Evolutionarily this aggression is a form of contest competition which aims on the acts of an individual organism in order to enhance its own fitness on the expense of other individuals. War becomes an agent of progress in which inter-group conflict can be seen as a prime mover of human evolution (culturally, spiritually, morally, and technologically) (Van der Dennen 1995, 117).

The cultural approach sees conflict and war as a cultural phenomenon and assumes that conflict is part of social structures, is influenced by individual actions and controlled by political structures. Hobbes also stated that by agreeing to covenants and the accepting of central leadership, a state of war could be avoided (Keeley 1996, 5). War is thus seen as a form of group-behaviour, in which personal aggression is transferred onto the cultural sphere of the group. One of the greatest military theorists, Carl von Clausewitz (1780-1831) already stated that "war is a continuation of policy by other means" (Mercer 2006, 199). He believed that mankind would eventually erupt in a state of absolute war, a war without restraints following the logic of force alone. War is then being used to solve politics and problems can be solved by armed response (Lider 1979, 109). This once again reminds one of Hobbes' total war idea. Malinowski (1884-1942) believed that war is an indication of cultural independence (Lider 1979, 10). When cultural groups try to achieve their political goals through conflict they separate themselves from others who do not have the power to pursue a similar goal. War can also be seen as a failure of interrelations between social groups. Social groups use war to claim express their identity and to establish their territorial boundaries (Lider 1979, 113). By competing for power, social positions can be achieved by individuals within a group or by groups themselves. Nationalism and religion can then be used to justify the violent actions of war (Eriksen 2001, 173).

The materialist approach is based on the assumption that warfare is needed for the achievement of basic material goals (Thorpe 2005, 5). War and violent conflict only arise when there is a direct need of food or territory. Competition does not cause large conflicts over large quantities of resources, like air. But food, water, mating rights and territory easily lead to conflict (van der Dennen 1995, 14). Fighting over resources will result in having a winner, who then is the resource holding power (van der Dennen 1995, 43). Violent conflict and outbreaks of warfare can be indications of socio-political crises, caused by shortages in resources (Gronenborn 2006, 16). McCartney however states that, based in an analysis by Ember & Ember, chronologically expected shortages of material can be causes of warfare, but they should not be seen as the prime predictor of warfare (McCartney 2006, 102). Other scholars state that the study of violence as a strategy does not give insight into the nature of violence, since an ethnocentric vision of social action is directly applied to the study of the past (Armit et al. 2006, 1). One of the leading ideas about the origins of warfare is a materialist one, which states that war can also be seen as a stimulus to economic change and to technological and scientific innovation, while ultimately increasing social cohesion (Lider 1979, 115). Otherwise, it can be regarded as

the product of three kinds of change: administrative, technological and Ideological/Organisational (Townshend 2005, 3; Ropp 1949, 16).

Next to these large-scale theories, many other causes can be ascribed to violent, inter-personal conflict, like matters of personal honours like an insult or punishment for theft, which could have rapidly involved multiple actors when occurring in a small-scale community (Thorpe 2005, 12). The origins of warfare and conflict are far more complex and cannot be confined to one single chapter. The three approaches mentioned in this chapter are only meant to illustrate the very basics of the origin of warfare and conflict, so that the earliest forms of conflict may be identified. Conflict and warfare can be studied by many other approaches like the Geopolitical, Legal, Moral, Sociological, Political, Psychological and politico-economic approaches. People fight and may have fought each other for many and varied reasons, from personal quarrels to large-scale conflicts. Possible causes for conflict may be social status, access to mates, access to intra-group resources, intrusion of a territory, redirected aggression and there are many more possibilities. Therefore, it is hard to assign a single cause and thus apply a single approach to the study of warfare and violent conflict in the past.

### 1.3 Toward a development of Conflict Archaeology

The study of warfare and intentional violent and armed conflict as a separate discipline is rather new to archaeology. The new archaeology and the post-processual archaeology made 'war' into an unfashionable subject which should only be seen in symbolic terms as a "by-product of the quest for power" (Pollard & Banks 2005, iv). Furthermore, with the 'bad taste' of the Second World War still in their mouths and the Korea and Vietnam wars raging throughout the fifties, sixties and seventies academics saw war as a non-favoured subject for academic studies. Vencl still noted a reluctance of archaeologists to study violent conflict in 1984 (Vencl 1984). The breakthrough which led to the increased study of violent conflict in archaeology in the 1990's was the book '*War before Civilisation*', in which Keeley illustrates how academics have created a 'pacified past' in which the importance of conflict and warfare has generally been denied (Gilchrist 2003, 1; Keeley 1996).

An early archaeological study about a battlefield was however undertaken by Edward Fitzgerald at Naseby in 1842, where he studied the battle which had taken place there which led to the discovery of a mass grave (Carman 2005, 216; Scott & McFeaters 2010, 4). Richard Brooke published his book '*Visits to the Battlefields in England of the Fifteenth Century'* about the same time. In the 1950's and -60's excavations were undertaken at the site of the battle of Aljubarotta in Portugal as ordered by the Portuguese

government (Carman 2005, 216). The first true pioneering work in the field of conflict archaeology was undertaken at Little Bighorn by Scott and Fox since 1989 (Pollard & Banks 2005, iii-iv; Scott et al. 1989). Their work resulted in the development of a methodology using metal-detector surveys, the mapping of individual bullets and cartridges and the application of modern firearms identification (Scott & McFeaters 2010, 7). Basic forensics were also applied at Little Bighorn, promoting the importance of interdisciplinary research (after Scott et al. 1989).

The first Centre of Battlefield Archaeology was established at Glasgow University in 2006 under the supervision of Dr. Tony Pollard. Dr. Pollard, next to Dr. Freeman of the University of Liverpool, is regarded to be one of the leading specialists in their field (Scott et. al. 2007, 2). They published the *Journal of Conflict Archaeology* which led to the first 'Fields of Conflict' conference being hosted by the University in Glasgow in the year 2000. Other Field of Conflicts conferences were organised in 2002, 2004, 2006, 2008 and 2011. The founding of the Centre of Battlefield Archaeology can be seen as the true establishment of the study of conflict in the field of archaeology. The term 'battlefield' archaeology here implies that the discipline merely focuses on battlefields. Therefore it is more often referred to as 'conflict archaeology.'

Warfare before the rise of state-level civilisations has still been often ignored by academics (Rose 2005, 4). There is however substantial archaeological evidence which proves that organised combat took place in prehistory (Saul 2009, 12).[1] During the last decade several studies about the role of violence and warfare in prehistory have been undertaken. Studying conflict before it was recorded in historical documents is an important objective of conflict archaeology (Wyse & Winkleman 1988, 44). Therefore the focus here is not only the study of 'war' in the strictest sense of the word, but on the study of war and violent conflict in the past.

Battlefields and military-related features have often had a secondary role in recent archaeological research and they have often been studied and treated as ancillary projects or as additional soil-marks when looking for older remains. Military archaeology as a separate discipline did not really exist a decade ago. Military history has often been preoccupied with the study of tactics and technical revolutions and differentials (Scott et. al. 2007, 2). While mainly focussing on combat itself is a necessity, the experiences of civilians and non-combatants also play an important role. Conflict archaeology makes a large contribution to the study of violent conflict in the past and gives more insight into the micro-level of the battlefield and the surrounding physical and social landscape

[1] More information about the archaeology of prehistoric conflict is described in Appendix A.

(Pollard & Banks 2008, 247). It can give insight into the last moments of an individual who was fighting on the battlefield, but can also contribute to the re-writing of complete battle-accounts. Many scholars and authors have copied each other's data, which may have been faulty, incomplete or subjective from the start, which has lead to a distorted image of the past. Many accepted battle accounts may actually be incorrect as they are currently known (Lynch & Cooksey 2007, 18). Conflict archaeology can make a change here, working from the field of written military history and contributing to it as well.

Conflict archaeology is aimed at the study of past military activity and its influences on landscape and society (Lynch & Cooksey 2007, 12). The discipline has an extremely broad field of interests and can be studied on a macro- as well as a micro-level. It may be focused on the site of one particular grave to the study of a complete regional area. Its sub-disciplines vary greatly and run from aviation archaeology to the study of genocide and concentration camps and it is concerned with the retrieval and identification of MIA's from past conflicts, the documentation of war crimes and the verification of the written record of violent conflict (Rose 2005, xviii). It does not focus on the material record alone, but also on issues like looting, monuments, landscape and war tourism. Nationalism, colonialism, popular protest, contested landscapes, preservation, ethical issues, these are just some themes which are connected to conflict archaeology. Many different methods and techniques are applied within the field of conflict archaeology and every sub-discipline has its own problems and methodologies. Some examples are the inclusion of forensic studies into the field of archaeology or the re-creation of ancient weapons and techniques in the field of experimental archaeology. But ultimately conflict archaeology is concerned with ordinary people who are caught up in violent conflicts and the impact that these conflicts had on their lives and environments (Lynch & Cooksey 2007, 11). Conflict archaeology does more than just give the 'true' account of a past battle; it describes conflict from their material manifestations to their social effects, from their early beginnings up to the present day. It thus studies conflict in the broadest possible sense (after Pollard & Banks 2005, vi).

### 1.4 Taking Fire: Critique on Conflict Archaeology

As was stated in the previous paragraph conflict archaeology only developed from the late 1980's onward due to the reluctance of properly studying war and conflict originating in the New Archaeology. In North-Western continental Europe Conflict Archaeology is still generally regarded to be a form of historical archaeology, mainly focussing on recent conflicts like the First and Second World Wars, especially in the Netherlands and Belgium. In Germany the heritage from the second World War is also being investigated, but projects like the investigation of the Varus-battle in the Roman period are also being undertaken (Moosbauer &Wilbers-Rost, 2009). Scandinavia also seems to have more interest in conflict archaeology, which is illustrated by the early research of the battle of Visby (1361) **(**Thordeman et al. 1939). In the United States of America conflicts like the American Civil War as well as the wars of the seventeenth and eighteenth centuries are the subjects of increasing investigation. Prehistoric sites displaying conflict have often been studied without denying the role of conflict and violence. A good example is the investigation of burials in Wassenaar, the Netherlands (Louwe Kooijmans 2005 (a), 461).[2] Conflict-archaeological research in the United Kingdom is furthest ahead in the field and it goes back from the study of remains from the Cold War to the Palaeolithic, including some iconic projects in the field of conflict archaeology like the investigations by Tony Pollard at the Culloden battlefield (1746) and Tim Sutherland at Towton (1461) (Pollard 2009; Fiorato et al. 2010). Dr. Pollard further works around the world in several ground-breaking conflict-archaeological projects, being one of the leading authorities in the field.

Conflict archaeology has thus not developed equally and it is valued differently around the world, leading to the development of critique on this field of archaeology. A general critique which is often encountered when talking to archaeologists or students of archaeology is that conflict- and battlefield-archaeology are forms of glorified 'detectorism' or treasure-hunting. Others criticise the scientific relevance of the study of conflict archaeology and its contribution to the overall study of archaeology and history. Some critics state that conflict archaeology belongs to the so-called 'modern era' or historical archaeology and that modern conflicts involve too recent material to be 'true archaeology' or they state that the study of conflict and battle is a form of popular-scientific pseudo-research.[3] In short their main critique can be degenerated to the same question: "What is the practical use of conflict archaeology?" To answer this question the

[2] More information about the Wassenaar burials is included in Appendix A.
[3] Based on personal discussions with colleagues, fellow students and others interested in history and archaeology.

applications and results or conflict archaeology projects have be further examined. An answer to this main question will ultimately be examined in the conclusion.

It is remarkable that conflict archaeology as a discipline is not included in recent works of archaeological theory. Conflict-archaeology, battlefield-archaeology and military archaeology are not specifically mentioned in standard publications like Renfrew & Bahn's *Archaeology*, Bintliff's *Companion to Archaeology*, Bentley's *Handbook of Archaeological Theories*, Preucel & Mrozowski's *Contemporary Archaeology in Theory* or Pearsall's *Encyclopedia of Archaeology* (Bentley et al. 2008; Bintliff 2004; Pearsall 2008; Preucel & Mrozowski 2010; Renfrew & Bahn 2004). This absence reflects that conflict archaeology is not being recognised as a separate archaeological discipline within the mainstream of archaeological thought. It should be noted however that complete standard works on conflict archaeology have not been written yet. Sutherland and Holst have written a standard guide on battlefield archaeology and Lynch and Cooksey have also attempted to write a standard work on the subject (Lynch & Cooksey 2007; Sutherland & Holst 2005). These works are however mainly descriptive and the underlying theory is not fully explored, although it should be mentioned that this is also not the main aim of these publications. Rose's *Archaeology of War* is mainly a compilation of case studies, but it provides a good basis for theoretical discussion (Rose 2005). The *Journal of Conflict Archaeology* and publications on specific conflict-archaeological projects further explore the theory behind conflict archaeology, but a standard work combining these theories has not yet appeared.

The distinction between 'historic' and other forms of archaeology is a main obstacle to conflict archaeology which needs to be deconstructed before continuing this research. Critics of conflict archaeology often state that archaeological study of the 'historical' period is already well documented in written sources, making the archaeological study of conflicts and battles obsolete an unnecessary. Conflict Archaeology and Historical Archaeology are thus often seen as interwoven disciplines. It is true that many conflicts from the past are known because they are recorded in writing and they have often been studied by historians. The definition of what 'historical' archaeology actually is remains rather vague depending on which part of the world the researcher is working in. In its broadest sense, historical archaeology refers to all periods for which written sources are available, roughly dividing the past in pre-history and history. Pre-historical archaeology thus refers to the periods before history was recorded in writing. Conflict archaeology focuses on prehistory as well as history.

This is problematic, since in some parts of the world the period concerning historical archaeology starts around 3000 B.C. with the emergence of the first writing systems in the Near East, while in the Americas historical archaeology is only concerned with the post-Columbian periods (Carver 2002, 474). In these countries the period from 1500 up to the present, often called the 'modern period' is regarded to be the domain of historical archaeology. Due to these different definitions it is hard to establish a general view of what historical archaeology actually is when applying a large discipline like conflict archaeology to it. It would therefore be wise to avoid the term 'historical archaeology' when working with conflict archaeology.

The written record of war and violent conflict is vast and varied. Conflict has been documented in official accounts, eye-witness reports, personal commentaries, poetry and histories. It should be noted however that authors each write with their own purposes and they should be placed within their own cultural and historical context (Rose 2005, xvi-xvii). The written record does not provide the objective truth, as far as objectivity is achievable. Each party involved will write a different story and the 'official' written history is often still written by the victor. Furthermore, many conflicts and military actions are never properly recorded and remain invisible in the historical record (Wyse & Winkleman 1988, 44).

Many aspects of the conflict will not have been recorded, since they may have been regarded as common at the time, like transportation methods or the daily actions of soldiers (after Lynch & Cooksey 2007, 9). Many traces of conflict simply remain unrecorded (Rose 2005, xvii). They may also be forgotten or they disappear due to the hand of time and some things, like atomic bunkers which are meant to remain secret. This way, "*40 year old bunkers may become as mysterious as 20.000 year old standing stones*" (Lynch & Cooksey 2007, 9). It is the task of the archaeologist to uncover these mysteries of the past and to find the parts of history that are not recorded in the written record.

Another distinction which creates confusion is the one between conflict- and battlefield-archaeology. In the introduction it was already stated that battlefield-archaeology was later replaced by the term conflict-archaeology. Battlefield-archaeology is, as its name already implies, the study of a battlefield. It is however not possible to study a battlefield without both understanding as well as contributing to the wider socio-cultural and material context of the conflict to which the battle can be ascribed. All kinds of issues belonging to the field of conflict-archaeology are being studied, like looting, landscape management, treatment of the dead etcetera. Studying a battlefield also is a form of

studying conflict in itself. The critique that battlefield-archaeology in relation to conflict archaeology is just "*counting bullets to reconstruct a battle,"* given by T. Toebosch after an interview with N.Saunders, a prominent conflict archaeologist, seems to exemplify that a distinction between battlefield- and conflict-archaeology is being made (quoted in van der Kooij 2009). Conflict archaeology however evolved from the beginnings of battlefield-archaeology, becoming more elaborate 'on the go' and developing from a sub-discipline of archaeology into a larger field of conflict studies. In its current form conflict archaeology and battlefield archaeology are thus virtually the same, only the name has changed.

### 1.5 Conflict Archaeology as a new and useful discipline

Conflict archaeology is still a much debated discipline within the field or archaeology which has to deal with a lot of critique, but which is nonetheless quickly developing and which becomes ever more popular. It also has to deal with a lot of new issues and obstacles, like moral and ethical issues or the inclusion of 'new' study objects like ammunition and the war-times destruction of cultural heritage. It is also increasing its scope outside of the 'archaeological box', encouraging inter-disciplinary studies and including other kinds of research like forensic pathology or ballistic studies. Its popularity with the general public is also rapidly increasing, since conflict archaeology does tell exciting stories about battles and local history and often re-creates battlefields which will later receive a public function. It should now be possible to synthesis a contemporary definition of conflict-archaeology based on the nature and subject of the discipline. In my definition conflict archaeology is: *"The research of the material remains of past conflicts, battles and military activity in order to verify and complement military history, to preserve military heritage, to provide additional information on battlefields, to study the development and application of weaponry and technology and to study the impact on the physical and psychological landscape and its inhabitants, as well as later generations inheriting the local physical and social landscape of conflict."*

By studying the 'visibility' of conflict in the documentary and material record, the next chapter will illustrate the current issues of conflict archaeology while providing more information about the practical application and significance of conflict archaeology, also illustrating its diversity and interdisciplinary character and fighting the point of critique mentioned in the previous paragraph. In the end it should become clear that the professional development of conflict archaeology. The rise of professional conflict archaeology exemplifies that many prejudices, metaphoric boundaries and faulty

argumentations which limit the academic potential of the discipline should be overcome, creating a conflict between archaeology and conflict-studies themselves.

# Chapter 2: Dealing with Documents

"*History is the version of past events that people have decided to agree upon*."

- Napoleon Bonaparte

One of the main types of critique on conflict archaeology deals with the subject of documentary sources. Critics often state that a large part of human history since the rise of organised warfare has been recorded in writing, making it unnecessary for archaeologists to investigate wars and battles from the past. In chapter 1 this critique was already opposed. It is true that some of the world's earliest writings and official depictions from Egypt and Assyria deal with war and conflict (Darragott & Keegan 1981, 10; Vencl 1983, 117). These writings and depictions provide a deeper insight into the minds of the people who were involved in a conflict, but they can also be used to study the location and the course of a battle or the social relationships between the parties that were fighting. But even in periods in which writing is available, conflicts and battles may still remain unrecorded in text or depiction and only leave traces in the material record. In order to avoid further complications, a distinction should be made between the material record and the documentary record at this point. The documentary record here refers to writings, as well as depictions and any other piece of human creativity which can be 'read.' A painting, especially an allegory, can be read like a story, just like an Egyptian wall relief or Palaeolithic paintings on a cave-wall. They are all documents since they can be 'read' like one can read a text (Barber & Peniston-Bird 2009, 1).

The documentary record, and writings in particular, is often seen as the primary source to understanding the people of the past, or as John Moreland describes it, as "*...the voices of the past speaking to us directly*" (Moreland 2003, 33). Many scholars see texts as primary sources for the study of history, with archaeology providing secondary information to complement with these texts (Andrén 1998, 23). John Moreland even states that archaeology has been used as 'the handmaiden of history,' referring to the scientific domain of history as opposed to archaeology (Moreland 2003, 11). There is an ongoing discussion between historians and archaeologists about the role of texts in which most historians criticise archaeologists for preferring the archaeological data over the written data and *vice versa*. Moreland blames most historical archaeologies, especially American historical archaeology, for failing to recognise the importance of the written record within the field of archaeology (Moreland 2003, 98-102). Material and written data are two separate sources of information which are seen and studied as generally unrelated and sometimes incompatible types of data. The documentary record and the material record however both provide different kinds of information and they should be studied in

separate ways using a different methodology, but applied equally in the study of conflict archaeology.

Documentary sources and material artefacts share many similarities. Just like objects documentary sources are a product of human actions, a form of self-expression which is capable of transmission of messages and which is subject to alteration, use, re-use, discarding and recycling through time (after Carver 2002, 473; Hodder 2003, 157). Documents and material culture are both susceptible to analysis through pattern-seeking and they both require source-criticism (Carver 2002, 473). The spoken word can be recorded in writing, making it available to everyone who can read the text throughout time. A recorded text can be carried across the globe and becomes a portable expression of human thought, much like many other portable artefacts. Studying the past through texts shows how people constructed themselves and their thoughts about the world around them, as well as the development of their thoughts (Moreland 2003, 84).

### 2.1 The Textual record

Written symbols are the most effective system devised by human beings in order to describe, control, organise, communicate and register the knowledge of a society (Renfrew & Bahn 2004, 403). It can also be seen as the main element of constructing rationality and logic (Moreland 2003, 87). Working with these written sources can provide a lot of interesting information, but it also poses a lot of problems. The main problem with any text is that there is a gap between the author and the reader of a text, which creates a black box between input and output, leaving the interpretation of the text to the reader. Cultural changes or the changes that have occurred over time between the social and political climate of the author and reader may lead to completely different interpretations. The original meaning of the text may then not, or differently be understood by the reader. Both objects and texts may also be differently understood by every individual reader or interpreter (Moreland 2003, 117). A document or artefact should thus always be studied in both its productive as its receptive context.

Texts are often written for specific purposes. Some of them are written for official or formal reasons, like records, while other texts are written as personal documents, like diaries or personal letters. No text is however completely neutral (Moreland 2003, 31, 85). Texts are modified in many ways to support a certain argument or to express a certain point-of-view. This phenomenon is called ‘gate-keeping’ (Lynch & Cooksey 2007, 63). A good example of gate-keeping is a propaganda-text, which is written with a specific message and which is aimed at convincing its reader of this message. Soldiers and especially their commanders have often been instructed to write down ‘sanitised’ and

socially acceptable versions of their combat-experiences, a form of gate-keeping which is very common in the study of warfare (Dobson 2009, 62). When studying a battle or conflict in the past it should be noted that, however not always true, history is generally written by the victorious party, as can be understood from the quote which begins this chapter. In some societies writing may only known to the elite or there may be other forms of social restrictions involved with the reading, writing and interpreting of texts. A text should thus never be taken literally and the reader should always try to understand who wrote a text, why this person wrote the text, and with which purposes the text was written as far as this is possible. Knowledge of the social background and society of the author can greatly help when trying to properly interpret a text.

A high officer or commander for exampled had a general overview of a battle unfolding before him, knowing the position of the separate units and the battle strategy which had to be applied ( after Kok 2006, 33). His experiences appear in official reports and memoirs. A soldier on the battlefield itself would only see the particular part of the battlefield on which he was fighting. A good example is given in William Thackeray's novel "The luck of Barry Lyndon", where the protagonist fights as a British soldier in the fictional British Gale's Regiment of Foot at the battle of Minden in 1759. The protagonist states: "*It would be easy for me to have said I was present when the orders were brought to Lord George* (Sackville, *red.*) *to charge with the cavalry...But the fact is I was two miles off from the cavalry...and none of us soldiers of the line knew what had occurred until we came to talk about the fight over our kettles in the evening"* (Thackeray 2001, 74-75). A common soldier's experiences will often only be recorded in letters and personal notes, but often not in official accounts.

The reader should not only place a text in its spatial and social context, but also in the appropriate time-frame. Just like material artefacts, texts should be dated. A text can be either a primary or secondary source. A primary source was written by the original author who was actually present when something happened, giving a first-hand account of the actual event. Secondary sources have been written after a specific event and are often based on primary sources. They can use the primary sources as source of information or they are written to criticise or possibly correct the primary sources.

Primary sources often contain detailed information and are considered to be most reliable. These texts can however still provide incomplete or faulty information due to gate-keeping and personal accidental errors during writing. When the data from the primary sources is copied by secondary sources, the errors are also copied, creating an incorrect image of an event. The planners of the invasion of Normandy on June 6$^{th}$ 1944 for

example wrote the name of *Pointe du Hoc* as '*Pointe du Hoe'* due to a general miswriting from a primary source (Lynch & Cooksey 2007, 61). The copying of errors has also lead to complete misinterpretations of battles. Carman exemplifies this by describing the results of archaeological research at Marston Moor, where a sunken road has often been interpreted as a crucial element of the battle which took place at the Moor in 1644. After archaeological investigation it turned out that road was actually dated to the eighteenth century and was thus not present when the battle took place (Carman 2005, 216).

Another example is the battle of Prestonpans, Scotland, which was fought on September 11th 1745. The battlefield has always been described as being situated between Prestonpans in the north-west, Preston in the west, Tranent in the south and Seton House in the East. Research was carried out by the Centre of Battlefield Archaeology of the university of Glasgow in 2008 and 2009 (Pollard & Ferguson 2008, 13). From this research it was concluded that the actual battlefield was not situated to the west of Seton House, but in the fields east of Seton House (Pollard 2010, 12). [4] A cart-track used for transporting coal by using horse-drawn mine-carts has been regarded as an important feature of the battlefield and just like the aforementioned sunken road at Marston Moor it has been wrongly interpreted as part of the battlefield (Thomson 2003, 14). The different accounts of the battle have been copied throughout the ages, thus resulting in a distorted and incorrect history of the battle of Prestonpans (Figure 1). Renfrew and Bahn state that archaeology can be used to verify textual data which was written in the past and its importance for conflict archaeology has been underlined by these examples (after Renfrew & Bahn 2004, 406).

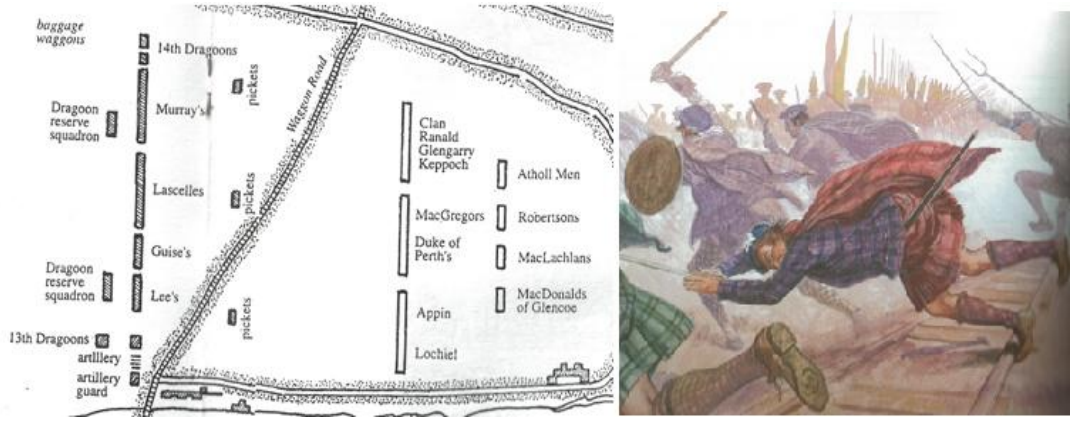


***Figure 1:*** A faulty map of the battle of Prestonpans depicting the coal wagon road between the enemy armies with an illustration of a tripping Jacobite soldier (After Thomson 2003; Reid & Embleton 2002, 10).

[4] Also see www.archaeologydaily.com, 21 April 2010.

Next to the theoretical problems of written sources, which mostly deal with interpretation, there are also some practical issues involved with the reading of texts. First of all, they can be partially destroyed. A text about an ancient Egyptian battle which is recorded on a temple wall may have become partially illegible due to erosion, collapse of the wall or deliberate destruction by treasure-hunting, revolt or vandalism. Certain texts referring to a specific ruler may also be destroyed due to *damnatio memoriae*. Texts which are written on perishable and organic materials like papyrus or parchment may have been stained or have only partially survived. Before a text can be read, the reader has to be able to understand and translate the grammar and vocabulary of the language in which the text was written. Without being able to properly read a text an Egyptian or Mayan hieroglyphic text remains to be a collection of pretty pictures or a French text will be nothing more than a text written in readable words which cannot be understood. Texts may also have been written in a dialect or a stylised form of an official script, like the use of capital and normal syllables. Sometimes the language of a text can be read, but the words are written in an old handwriting which should be deciphered before the text can be written. Handwritings varied throughout time and every author may have had an own specific style of writing. Official texts were often written in a formalised secretary hand, which makes it easier to read them. The standardisation of texts makes it easier to read a text, since a standardised script was written to be recognised by a large number of literate people. Standardised writing was already present among the Near Eastern societies like Egypt and Sumer around 3000 BC, with the world's first complete writing system being invented in the latter (Fischer 2004, 48).

Some types of text may be written in code, like telegraph-messages which are written in Morse-code. The code has to be understood and deciphered before coded texts can be read. Normal texts may also contain secrets which the reader should be aware of, like riddles, chronograms and hidden coded messages. Specific abbreviations which are unknown to the reader may also be used. The contents of the text may also pose problems, since proper names and geographical names may have been written differently in the past or other kinds of deviating orthography may have been used in the past.

It should be clear by now that both material sources and documentary sources contribute to the picture of the past by providing different data structures (Vencl 1983, 130). They both should be 'read' in separate ways, but in the end the data they contain should be related and compared to each other, making it possible for the sources to supplement and verify each other. When archaeological data is poor, documentary sources can be used to carefully support the available archaeological evidence. Likewise, when archaeological

data indicates a pattern which is not well represented in documentary data, both sources can be used to supplement each other. The latter is often the case in the study of domestic space (Allison 2001, 203-204). When using written sources, the reader should read critically and be aware of the intentions of the author and the general reliability of a text. Several other problems like the use of illegible handwriting or the presence of hidden messages may be encountered. Therefore it is important that the reader has a basic knowledge of the historical period and the social and political background which are involved with the writing of the text. Conflict Archaeology can definitely be added to one of the main disciplines which deals with these problems and which can be used to further promote the integration of historical documentary sources and archaeology. But conflict archaeology also focuses on places and periods without a written history, like prehistoric and illiterate societies. Therefore, conflict archaeology should not be seen as a sub-discipline of historical archaeology, but as a unique individual discipline containing many sub-disciplines of its own within the field of archaeology.

### 2.2 Types of textual sources

Due to their abundance it is impossible to provide a complete list of available documentary sources which can contribute to the archaeological investigation of a certain conflict or battle. Several common types of documentary sources which can be used to study a conflict in the past are briefly mentioned below, together with several of their advantages and disadvantages and to illustrate their importance. Official records and archives contain a wealth of information about a battle or conflict. Official records often include administration, like inventories of property, prisoner lists, award lists, burial reports, financial and legal documents etcetera. They can be used to study the physical landscape in which a conflict took place as well as its inhabitants and their social status and situation. This also hold true for the soldiers who fought and died. These records often contain personal names, pay grades and more information which can be used to gain an insight into the persons who were present during the conflict as well as their influence and role during this conflict. Separate armed forces branches may leave a wealth of documentary information. The Royal Air Force archives for example may provide a researcher with Aircrafts records cards, Individual Combat Reports, Unofficial squadron diaries, Operational RAF Record Books, Manuals, Part lists and Blueprints which all contribute to the story of a conflict (Bédoyere 2001, 14-19). Newspapers are also official sources which give insight into the social, political, economic and cultural life of the past (Vella 2009, 192.).

Official correspondence and letters give detailed information about the dealings of the persons involved with a conflict, but they were often not personal letters. They may have been intended to be read aloud during meetings or to be read by a group of persons. They may have been specifically copied for multiple readers. Official accounts left by commanders and other eye-witnesses, together with memoranda, official correspondence and an entire body of official administration and give inside information about conflicts and they are often compiled from data provided by individuals who were present at a battle or conflict to create a general account of this particular conflict. Together with official decrees and treaties they fit into a historical framework which combines individual battles and skirmishes into larger wars, conflicts and eventually into complete periods and developments which together shape human history. Although official records may provide interesting facts and numbers, it should be noted that gate-keeping plays an important role here and official accounts tend to only give a one-sided picture of a certain conflict.

Personal accounts are often primary sources which tell the stories of people who were involved in a certain conflict. They are more emotionally written and they often include personal remarks, opinions and views of the conflict which are not recorded in official accounts. Diaries for example are very personal possessions and they reflect the personal thoughts of their author. They also display popular ideas, fashions, taste and manners from the period in which they were written (Hämmerle 2009, 148.). Being primary sources, they can give a useful insight into the social situation during a conflict, but they may also contain interesting details about certain battles or developments which took place during a conflict. They are often very subjective and they should be interpreted from the social, political and personal situation of the author and the possible faction to which he or she belongs. When a diary is edited or re-written by the original author or an editor, information may be altered or left out, like with the famous diary of Anne Frank, which was later edited by her father Otto Frank.

Personal letters, although in contrast being less voluminous, contain the same information which can be found in diaries and they can give insight into the domestic world and the relationships of an individual. Soldiers' letters are often written to comrades, sweethearts, wives and families and they display the thoughts of the soldier and his life at home. They provide the reader with a glimpse of the author's personal and social life (Dobson 2009, 59). Soldiers are often confronted with letter writing when they are stationed far away from home. They use letters to express their visions and to create their own mental place within a conflict. Personal letters are however often censored by armed forces and soldiers have often been instructed on how to write their letters. Important information

was often forbidden to be included into a personal letter. On the other hand the home-front may also have been instructed to write inspiring and morale-boosting letters to their loved ones (Dobson 2009, 62-63.). Despite these instructions soldiers may also have received letters about the loss of family and brothers in arms, as well as the infamous 'Dear John'-letters in which their lover declares the end of their relationship. Reading a certain letter gives individuality to a name from the past and makes it possible to understand the author's and the receiver's emotions. Conflict archaeology may thus bring the archaeologist closer to an individual that lived in the past. Letters may also contain information about archaeological interest-areas. The site of an airplane crash, of which all other documentary sources were lost, was described in a note made by a schoolboy in England (Bédoyere 2001, 15). The note may be used to lead conflict-archaeologists to the crash-site.

Personal eyewitness accounts are often primary sources which contain detailed information about specific events that took place during a conflict, but gate-keeping again plays an important role here. People may include fantasy and embellished or fictional events into their accounts to make them more interesting. Considering the fragment from '*The luck of Barry Lyndon'* given earlier, the protagonist already states that he could have mentioned that he saw the actions of a certain commander in person, although he himself was far away from the commander at the time. Another personal document is the autobiography. This kind of document is very susceptible to gate-keeping, since it is based on memory and the author probably includes embellishments to support his story. Documents, both official and personal, display different forms of gate-keeping, which should be kept in mind when trying to interpret these sources.

### 2.3 Depictions: The iconographic and pictorial record

Before the rise of writing systems the image was used to transfer and record messages and information, as is evident in the huge amounts of so rock-paintings and inscriptions found around the globe. But even after the emergence of writing systems the visual image remained to play a very important role in human perception. Images are still a very effective medium of communication, often leaving a deeper impression on humans than written sources, especially photographs and paintings depicting war and violence. Furthermore, illiteracy has been a very common phenomenon in human history and writing systems, how effective they may be, have been available only to selective parts of human society. Textual sources have only been available to people who could read and write and their message could only be transferred to illiterates by these literate people,

allowing gate-keeping and personal interpretations to interfere with the original message. A lot of information has been written down, but not everything can be captured in words.

The 'image' in this chapter refers to all non-textual two-dimensional depictions, although written words may be applied in these depictions like a text written on a sign in a painting. In conflict archaeology the image is an important type of document which provides the observer with visual information of an actual conflict or battle. Images of conflict violence and war appear throughout history and they are a common theme in the visual arts an artistic depiction (Paret 1997, 10). Edelman stated that 'art' is *the fountainhead from which political discourse, beliefs about politics, and consequent actions ultimately spring"* (Edelman 1995, 2). Visual expression is used to record conflict, but it is also use to comment upon this conflict and to influence the perception of the observer regarding the conflict. Therefore, when combining the study of art with the study of history, one has to be aware that there is a conflict between cultural production in art on the one hand and the reality of history on the other hand (Cuneo 2002, 4).

As a relatively modern concept the term 'art' however cannot be directly applied to the past and to archaeology (Corbey et al. 2004, 374). A good definition of the concept which is often referred to as 'art' in archaeology is posed by Dr. R. van Walsem, Egyptologist, archaeologist and art historian at the university of Leiden: "*Art is the term for individual and/or collective product of human behaviour in which by means of artefacts and/or performances in a relatively creative and original way- beyond the purely functional – a concept (in the widest sense of the word) is skilfully expressed, resulting in an intellectual and emotional interaction between the maker and the observers (including the patron)*" (René van Walsem 2003, personal communication). Art is thus aimed at artefacts including iconographic material, going beyond the purely functional. Iconographic material in archaeology can then be studied by iconographic analysis, formal analysis, semiotic analysis, functionalist analysis and aesthetic analysis (Corbey et al. 2004, 361).

A sense of visual expression was already present among early civilisations. Visual expression did however play an important role among the early large-scale civilisations in the Near East and the Southern and Central Americas, as well as the Roman and Hellenistic world. The earliest known depiction on which actual warfare may be depicted is the Egyptian Narmer Palette, dated to 3100 B.C. (Gabriel & Metz 1991, 48). The Stele of the Vultures (figure 2), dated to approximately 2525 B.C., is the first known depiction of armed soldiers and also the first depiction which shows the use of body armour (Gabriel & Metz 1991, 4, 51). Depictions of war and conflict in the ancient world are abundant. Egyptian wall reliefs depict the battles of Qadesh and Megiddo, Greek pottery

and wall paintings show the armament of warriors and phalanx-formations manoeuvring across the battlefield and the Roman reliefs on Trajan's column in Rome depict the life of the Roman army during the Dacian wars. All these ancient depictions provide an insight into the organisation, equipment, tactics, social life and combat experiences of an army. Medieval depictions of wars show chaotic battlefields and besieged towns accompanied by other acts of conflict and violence. Sometimes the reality of war even dominates its artistic representation in medieval art (Paret 1997, 13). Each visual depiction of conflict provides information about the particular conflict, it only carries a different meaning or message. The conventions of depiction and ideology differ in each culture, period and geographical region, making it necessary to gain a deeper insight into the culture which produced a certain work of art before actually studying the depictions themselves.

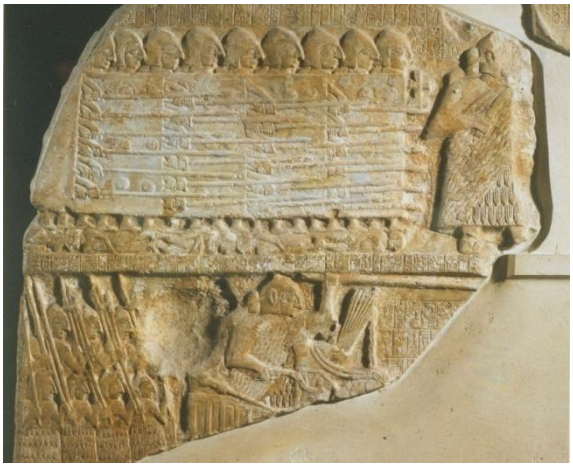

***Figure 2*:** Detail from the stele of the Vultures, the first known depiction of armed soldiers (Photo by Drs. T.J.H. Krispijn).

Many military historians study depictions of warfare from the Renaissance onward, since the origins of 'modern war' are supposed to lie in this period. Medieval depictions of war are often the domain of the medieval historians. Roman, Egyptian or Assyrian depictions are respectively studied by classical archaeologists and historians, Egyptologists and Assyriologists. These specialists know how to 'read' the depictions and they understand the underlying ideology. The Egyptian pharaoh leading his army gloriously into battle with his soldiers following behind him is nothing more than propaganda, as is perfectly explained by Egyptologist Garry Shaw (Shaw 2009).[5] Archaeological and anthropological evidence show that the great warrior pharaohs display no signs of physical injury, nor did some of them possess the physical appearance and capabilities to be a warrior (Rose 2005, 30-31). Whenever a conflict-archaeologist studies these

[5] Lecture 'Kings at War in the 18th Dynasty' held by G. Shaw at the NVIC in Cairo, 21 November 2009.

depictions, specialist knowledge or the help of specialist is needed for correct interpretation. Depictions of war, both ancient and modern, are all influenced by ideology and decorum, which they also reflect.

From the Renaissance onward, the main artistic depictions of war in have been recorded in oil-paintings in both Europe and the Americas. Since these paintings brought the general visual depictions of war among the public, they greatly influenced the public's perception of warfare. Even today the eighteenth century paintings showing battle-lines which are made up out of colourful uniformed men, walking in tight formations and being led by heroic commanders on their chargers , strongly influence the way in which eighteenth century battles are perceived by the general public and academics alike. The paintings often do faithfully show the types of battle formations and the uniforms and equipment used in battle and often even the weather conditions and other features which dominated the battlefield are visible in the composition. The life of soldiers was also often quite well depicted in paintings. The problem here is that artists who made the paintings were often not present at the battle or within the conflict itself, relying on written and oral accounts, maps, models, uniforms and other contemporary sources to create a realistic picture of the battle or conflict. The degree of realism however depends on the artist's way of seeing and understanding the battle or conflict itself. (Paret 1997, 14).

One of the most famous military-themed paintings from the eighteenth century probably is 'The Death of General James Wolfe' by Benjamin West (Figures 3 & 4). The painting depicts General James Wolfe dying after the battle at the Plains of Abraham, outside Quebec, with several officers of different regiments supporting the dying general. The painting clearly does not represent the actual conditions in which Wolfe died and Paret calls it a '*pieta*'- like work (Paret 1997, 47). Although the painting was painted well after the battle and is no faithful reproduction of the actual death of Wolfe, it does however provide interesting information. The officers for example faithfully represent regiments which were present at the battle, wearing correct and detailed uniforms. This is remarkable, since it would have been more obvious to depict Wolfe among his officers depicted as Classical heroes in the eighteenth century (Mitchell 1944, 20). In the background many detailed actions and depictions are visible which can be related to written sources about the battle, like soldiers arriving in longboat or climbing the rocks. According to Montagna West has done a lot of detailed research to provide authentic uniforms and equipment together with a complete narrative of the battle, its main events being depicted in the background culminating in the death of the general a centrepiece

(Montagna 1981). West seems to have evoked a more detailed form of military genre-painting in the late 18th century, which was now often aimed at depicting realistic details about the battle. After the French Revolution and into the nineteenth century historical accuracy and realism became ever more important in military-genre paintings (Paret 1997, 65-66).

***Figure 3:*** Benjamin West's 'The Death of General Wolfe' from 1771 (National Gallery of Canada).

***Figure 4:*** Penny's 'Death of Wolfe' from 1763 in the Ashmolean Museum. A more realistic depiction of Wolfe's death compared to the famous work by Benjamin West (Mitchell 1944, 6).

Other important iconographic sources are sketches and drawings. People often drew sketches of what they saw in journals or on scraps of paper, *ostraca* or other surfaces. These sketches are often primary sources, left by people or soldiers who actually drew what they saw at a certain moment, much like a photograph, but susceptible to the artist's eye for detail and ability to draw realistically. They usually have an unofficial character and are personalised, often containing visual details that specifically drew the attention of the artist. A good example is the so-called Penicuik artist who travelled along with the Scottish Jacobite army in 1745/46, making drawings of battles and everyday life in the army (Figure 5) (Pollard 2009, 16). The first photograph was made around 1826-27 (Sayer 2009, 53.). Since then, photography has been used to document wars, starting with the Crimean and the American Civil War (Sontag 2002). During the following conflicts the visual media played an important role, which has led to archives filled with visual images of conflicts, which are often readily available to the conflict archaeologist, providing information about a wide range of subjects, from battle formations and a view of the temporal landscape at a certain time to the personal equipment worn by specific soldiers and units.

***Figure 5*:** Two illustrations of Jacobite soldiers sketched by the Penicuik Artist (After Pollard 2009).

Before the Late Medieval Period oil-painting on wooden panels and cloth or canvas was not very common and other iconographic means of depiction were often used. Frescoes, wall-paintings, reliefs sculpture and tapestries are among the iconographic sources for these periods. Not merely focussed on the aesthetic, these sources often providing detailed iconographic information about the armament, equipment, tactics, battle orders and military life in many armies from the past. One of the best and earliest depictions of sculpture as iconographic source for military depiction is the Qin Terracotta Army, a complete army made up of clay life-sized sculpted soldiers and horses. The sculptures are highly detailed, even showing the clasps and nails used to fasten the body armour the soldiers are wearing. The soldiers were often holding real weapons of bronze and iron (Kesner 1995, 118). This iconographic source provides an enormous amount of information about clothing, armament, equipment and battle formations used in Qin-dynasty China (ca. 221-206 BC). The Ancient Egyptians also faithfully depicted many military units and soldiers in sculpture and reliefs. Some examples of Egyptian military sculpture are the wooden models of infantry units from the tomb of Mesehti in 11$^{th}$ dynasty Asyut (ca. 2134-1991 BC). Many Egyptian palaces and temples depict Egyptian and foreign soldiers or battle scenes. Trajan's Column in Rome, built in 113AD, depicts Trajan's Dacian campaigns in a long band that runs up around the column in a spiral-shape. It shows many detailed aspects of the life in the Roman Legions as well as depicting equipment and battles. A similar continuous band-like depiction is the Bayeux tapestry depicting the history of the battle of Hastings in 1066 AD. It also provides a lot of unique detailed information about medieval weapons, armour, equipment and ships. Other conflict-related activities like the distribution and transportation of weapons and supplies are also visible in the tapestry. Many depicted objects, like weapons or drinking

vessels can be related to actual artefacts which have been excavated (Neuman de Vegvar 2011).

Maps can also be regarded as images. Before a battle was undertaken it had to be planned. A commander had to see the landscape before he actually deployed his troops there. Therefore he was provided with maps of the chosen area of battle, on which he could select the appropriate lines of transport to and from the battlefield and the tactical advantages he could take from the terrain when deploying his men. Maps are vital tools for archaeologists, as well as for soldiers. Although elaborate patterns in prehistoric rock-art may or may not represent maps, the earliest identified schematic maps are known from ancient Babylonia and are dated to the 6th or 5th century BC. The ancient Greeks and Egyptians are known to have made schematic maps, but no detailed geographical maps have been discovered from these periods. (Bagrow & Skelton 2010, 31-32). The first map which may have been used for military purposes in the Roman *tabula Peutingeriana*, which was discovered by Konrad Peutinger (1465 - 1547). Exploration and the movement of armies across the world has undoubtedly contributed to the development of cartography. The first accurate military maps were made during the seventeenth century. The Dutch Nicolaus Samuelis Cruquius (1678-1754) created one of the earliest contour maps. Extensive surveys were carried out by the European nations, leading to the creation of military maps (Lobeck 1944, ix). It is known that the Tower drawing room in London became a British seat of military cartography on the 22nd of October 1717 (Marshall 1980, 21). Engineer units became ever more specialised in the drawing of accurate military maps, which could later be distributed for civilian use as well.

Military maps have been made of many battles and textual descriptions of battles often include pictures of maps to illustrate the text. A battle-map shows the positions of the units in armies, as well as the battle lines and the movement of troops across a battlefield. Maps depict the actual location of a violent engagement like a pitched battle within the larger landscape. They also provide the observer with the relative location of specific military units on a battlefield at a certain time. Maps further give an insight into the situation and appearance of the landscape in the period in which a battle was fought. Important features like buildings, roadways, waterways, forests, trees, settlements, defence works, places of strategic importance and topographical features can be found on a map.

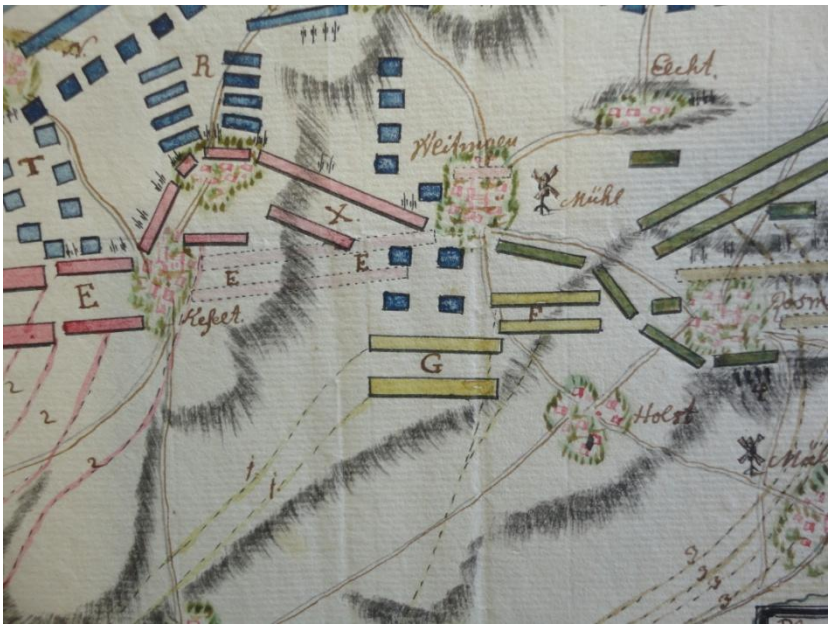


***Figure 6*:** Detail from a map depicting the battle of Lafelt in 1747. Several towns, landmarks, battle lines and the movement of units is depicted. The names of the towns are in old spelling. 'Vlijtingen' is written as 'Weitungen' for example (Universiteitsbibliotheek Leiden, Collectie Bodellianum, Number B9 - 112).

The conflict archaeologist, just like all other archaeologists, needs to be provided with detailed maps of the research area. Topographical maps, geological maps, elevations maps, historical maps and, when available, maps of the actual battlefield all contribute to the reconstruction and localisation of areas of interest. Important features on the historical maps can be cross-referenced with a modern map, as in order to re-create a map of the battlefield in its current state. By using maps, the conflict-archaeologist can locate places of archaeological interest, like artillery positions, battle lines, unit positions, artillery positions, fortifications etcetera. A basic knowledge of how to read maps is important, but the observer should also be aware of specific types of maps. Some maps will be ethnocentric, using a certain capital, city or landmark as the centre of the map. Other maps will show fictive or wrongly situated features. The observer should also be able to orient himself on the map. Oriented here means that the observer knows the direction of the north from his present position (Lobeck 1944, 85). The orientation on the map itself is generally indicated by an arrow or another symbol indicating the direction of the north. When there is no indication, the topside of the map represents the north, but this is not always true. When working with a map without orientation, the orientation can be found by cross-referencing known features on the map with oriented maps that depict the same subject. The location of prominent features on maps are probably quite accurate, since topographic maps are often based on these features, which are pinpointed using triangulation/ This is called primary horizontal control. (Lobeck 1944, 27).

In the seventeenth century the *vedute* became a common theme in military painting. The *vedute* is a wide-angled painting in which the entire battlefield is represented with the battle often being at its climax. An area of raised ground, often the foreground of the composition, is often occupied by the commander or commanders of the battle (Paret 1997, 40). Sometimes the depiction of the battlefield is incorrect and the theme of war is merely used as a background for another depiction, like the portrait of the commander in the foreground. On the other hand, the *vedute* may represent an attempt to create a three-dimensional depiction of a known battle-map. This way, the *vedute* may serve as an attempt to accurately depict the factual battle based on an original military map.

Robert Capa (1913-1954) and Eddie Adams (1933-2004) have become well known war photographers during the twentieth century. The 2003 invasion of Iraq was characterised by the presence of reporters on the front lines, bringing the reality of war closer using film and photographs. The photograph is a still image which shows a situation from the past, what can be seen in the picture is real; it was actually present in the same form at the moment the picture was taken. It is, as Sayer states, "a footprint of history" (Sayer 2009, 54.). In the American Civil War soldiers often carried photographs with them, so that they could be with their family, displayed in the pictures, when they died (Faust 2001, 14.). They also carried around their own portraits on which they often pose with their personal firearm. These photographs can be used to identify a fallen soldier, especially when he is carrying objects which are visible in the photograph. Photographs evoke emotion, more than moving images or paintings, because they reflect a visual truth, a real snap-shot from the past. It does not however display the objective truth, since an image may be altered or the objects and persons in it may have intentionally been placed in a certain position. It is however a memory kept in its original form, unlike a painting which is constructed after an actual event has taken place. A photograph is the closest primary source available as a still image.

Before the invention of photography, the depiction of war was the domain of the artist. Depictions of conflict reached the people via paintings, sketches, illustrations in journals and newspapers and in sculpture. Photographs and sketches in newspapers are functional, since they illustrate a story, but on the other hand they are also pieces of art aiming to express aesthetic values (Wauters 2009). Photographs thus belong to the domain of the visual arts as well since they transcend the purely functional. In today's modern world, images of war have become part of everyday life. Newspapers and the six o'clock journal bring war and conflict into our very living rooms almost daily. Photographs and films can be made with digital cameras or mobile phones and they can be transmitted and distributed world-wide in seconds due to the availability of internet. The 2011 February

revolutions in Egypt were also known as the 'Facebook and Twitter' revolution, since these relatively new media were used by young Egyptians to send videos and pictures from the ongoing violence across the world. Computer-games, digital video-websites and Hollywood films have integrated war into the daily lives of people who do not live in a conflict-zone themselves. Images of war have become generally accepted and it is relatively easy to imagine what the modern field of conflict looks like. War has even become a cliché by this constant stream of visual images, which has increased our mental distance from war and conflict.

### 2.4 Graffiti: War on the walls

Graffiti can be classified as one of the most unique, yet generally represented documentary sources left by people. It is present world-wide on almost every conceivable surface (Gadsby 1995, 1). The drawing of 'stick-men' is present in graffiti everywhere around the globe (Sheon 1976, 20). Graffiti is also present throughout the largest part of the human past. According to Aaron Sheon graffiti is part of man's basic creative instinct and his most primary form of art (Sheon 1976, 22). Robert Reisner acknowledges Palaeolithic rock-art to be one of the first examples of graffiti (Reisner 1971, 24). Gomez supports Reisner in this view and adds that true written graffiti in contemporary Western culture originated in Classical Greece (Gomez 1976, 636). Human beings are symbol-using beings who communicate purposely and deliberately (Rodriguez & Clair 1999, 12). Every object, drawing or painting in a surface that can be recognised as a depiction is a symbol (Renfrew & Bahn 2004, 397). Palaeolithic rock-art can thus indeed be seen as one of the earliest forms of graffiti. Examples of graffiti are known to have been left by the ancient Egyptians, Classical Greeks and the Romans. It can be stated that graffiti is probably as old as mankind itself and it can be observed in almost every culture world-wide being used up to the present day. Based on given definitions from books and articles concerning graffiti, a basic definition of 'graffiti' may be: "*Writings, pictures, symbols, markings or any kind of visual expression of an unofficial nature inscribed or carved into almost any kind of accessible material surface, both public and private, which are often unwanted or unauthorized and which are often, but not always, left by anonymous individuals, often with a contextual meaning*." [6]

[6] Definition based on: Blume 1985, 136; Blume 1985, 141; Gadsby 1995, 2; Lynn & Lea 2005, 40; Lynn & Lea 2005, 42; Lynn & Lea 2005, 52-53 ; Klingman et al. 2000, 302; Rodriguez & Clair 1999, 12.

Graffiti often reflect a person's thoughts, the thoughts of the actual author who left the graffito at its direct location, the author thus was actually there. Tracing the author is often not possible, since most graffiti is often anonymous (Rodriguez & Clair 1999, 2). Graffiti can be used to say anything to anyone and can be used to reflect, thoughts, values, views and ideas which are incompatible with the contemporary value-system and the associated public opinion (Gonos et al. 1976, 46; Rodriguez & Clair 1999, 10; Giles & Giles 2007, 344). By staying anonymous the author protects himself against retribution. Its rebellious character and the usually negative message and it appearance on public surfaces as a form of defacement give graffiti an unauthorised and unwanted character (Lynn & Lea 2005, 40).

Graffiti can be  with a wide array of materials, like metal, sharp rocks, cutting tools, shoe polish, grease, wax, paint sticks, nails, orange juice (which becomes visible when heated) and blood (Gomez et al. 1976, 643; Fenn 1969, 420.) Other materials like lipstick, oil, ochre, charcoal, spray-paint and almost any tool or material which can be used for writing or carving can be applied when leaving graffiti. It can be left by an individual or by groups. Blume recognises several contexts for the creation of a graffito: [7]

a) The individual is alone

b) The individual is alone whilst waiting [Which soldiers do]

c) Documentation of one's presence at a place.

The context of creation can often be deducted from the content of the graffito (Blume 1985, 139). A distinction can be made between public and private graffiti (Rodriguez & Clair 1999, 2). Public graffiti is situated on publicly visible places, like the outside of buildings and structures, while private graffiti is often situated on the inside of buildings. Public graffiti is written so that everyone can see it (Figure 7). Private graffiti however is located at places where the author was sitting, often waiting. An example of this are the so-called *excretiae* or *latrinaliae*, the texts left on public toilet walls and doors, which often carry a sexual or obscene message. Private graffiti can often be found next to windows and doors in buildings (Giles & Giles 2007, 345; Reisner 1971, 4-5).

[7] Blume 1985, 138.


***Figure 7*:** Hidden Public Graffiti. A message written in graffiti which becomes visible after climbing the *Castel St. Angelo* in Rome, but is invisible when walking on the bridge.

Just like other kinds of texts and depictions, graffiti must be contextualised before it can be understood. Graffiti is often written in abbreviations or in code. It carries a hidden message (Lynn & Lea 2005, 51). So-called peace symbols have widely been used in graffiti (Klingman et al. 2000, 300). The observer first needs to recognise this symbol as a symbol representing 'peace.' It has to be placed in its context. Most peace-symbols are left during times of war, especially during the Vietnam-war. They can be understood as a criticism on the policy of a certain government during a war or conflict. But they can also be left with other reasons. But the symbol has another deeper meaning. The peace symbol is actually a combination of the semaphore initials 'N' and 'D', standing for Nuclear Disarmament, created by the artist Gerald Holtom (Fields 2008, 26). Nuclear disarmament was a main issue during the Cold War. When studying graffiti it is important to understand where the graffiti is located and why, who the author was and when the graffiti was made. Once again, the content may reveal the needed data. A name and date can be provided by the author. Dating can also be based on analysis of the general style of spelling and handwriting. The language in which the graffiti was written and specific symbols belonging to a faction or group can be further used to analyse the graffiti. When studying graffiti, one has to be aware that the graffiti probably provides an inverted image, since it often did not fit the public opinion and system of values at the time of its creation.

Graffiti can be left by people for many reasons. Regina Blume created a model of motives to leave graffiti which is widely accepted by scholars who study graffiti (Blume 1985, 143-145). The model is illustrated below with additions taken from other articles and books concerned with the study of graffiti, as well as some examples:

- ⇨ Proof of existence, *scribe ergo sum*. Prisoners often leave graffiti. This is well documented in the Tower of London, where coats of arms have been left by prisoners (Fenn 1969, 420). Graffiti was even left in the smallest cell, the 'little ease' (Reisner 1971, 46).
- ⇨ Need to express oneself.
- ⇨ Documentation of group membership. It establishes one's identity (Rodriguez & Clair 1999, 6).
- ⇨ Pleasure in aesthetic, creative and physical acts.
- ⇨ Boredom.
- ⇨ Expression of criticism, protest, rejection or agreement. It is used to vent hostilities, express fantasies, declare rebellion and to promote propaganda. It can be an outlet to express feelings about race, gender and sexual orientation (Rodriguez & Clair 1999, 2).
- ⇨ Marking of a territory or sight-seeing graffiti. Ancient Egyptians often left cartouches and *Serekh*-markings along desert routes to claim the territory (Darnell 2006, 5). This was also done by Arabic Nomads along migration trails (Reisner 1971, 68). Markings are often left by people on places where no human landmarks are known to have existed before or to create space in an empty environment (Darnell 2006, 2). Navigators who had rounded the Cape of Good Hope left graffiti at the so-called Pletenberg Bay Stone (Reisner 1971, 73). Graffiti can also be left in caves or on mountain tops by people who struggled to get there and often symbolically claim the territory. It can also be used for re-taking or re-claiming public spaces (Lynn & Lea 2005, 40).
- ⇨ Search for contacts, like leaving a phone number on a bathroom door.

A special form of claiming space studied by conflict archaeology is the capturing and marking of enemy territory. The capturing of the area is a physical as well as a symbolic act, which can be reflected by leaving graffiti and which also serves as a sign of defiance against the enemy. Good examples are the graffiti left at the German Reichstag building, several days after it was captured by Russian forces in April-May 1945 (Baker 2001, 20). Other examples are the graffiti left by US soldiers on the red marble fireplace in Hitler's Eagle's Nest in Germany or the Rainbow left by the 42$^{nd}$ US Infantry Division at the rocks near Weißbach bei Lofer in Austria after capturing the area (Figure 8). Baker refers

to this kind of writing as ‘victory tourism,’ which turns the walls of a captured monument into a ‘guestbook’ (Baker 2001, 23).

***Figure 8*:** Graffiti left by members of the 42nd US Infantry Division, nick-named the ‘Rainbow division,’ after capturing Weißbach bei Lofer in Austria. It has been restored multiple times.

Graffiti is often not actively studied by archaeologists. As was posed in the previous paragraph, text can be seen as an artefact, so graffiti can also be regarded as being an artefact (Ouzman 2010, 3). Giles and Giles call for an archaeological approach which is needed to set graffiti in a wider social-historical context (Giles & Giles 2007, 337). Sheon also pleas for an archaeological approach and states: “*Before popular imagery completely disappears it must be studied from its origins, its flowering in the past and its present development. Already the prints of last century form a category of new archaeology which requires thorough research. We must look deeply into their art and leave aside the notions of technical skill and imitative ability.”* (Sheon 1976, 21).

Graffiti can indeed be used as an archaeological artefact. It may even be the ultimate combination between a material artefact and a documentary source, since it can be present on an actual archaeologically excavated structure or material artefact. It can also be an expression of human engagement with a landscape (Darnell 2006, 2). Graffiti can be seen as a form of freedom which reflects a person’s personal ideas, opinions and thoughts. It can thus be used to examine the mind of the individual writing the graffito. The graffito may be used to study the psychological and social conditions of this author (Klingman et al. 2000, 299). It is also a marker that the actual author was present on the spot where the graffito was left. When it is placed in its social, spatial and temporal context, the graffito may give a deeper insight into the community concerns, the social climate, religious struggles, the political climate and the tensions between social classes of a certain time and place.

Every text can start a dialogue, but a special characteristic of graffiti is that it is able to start a dialogue which can be responded to by adding visual elements to the original inscription (Lynn & Lea 2005, 59). It can invite anonymous authors to engage in a dialogue with each other. One author leaves a message and another one responds to it, often in another handwriting. These are dialogues between authors, but because both authors often stay anonymous there is no direct communication. Blume states that these kinds of dialogues are a form of defective communication (Blume 1985, 142). This kind of communication can already be observed in Ancient Egypt. In the tomb of Thutmosis III in the Egyptian Valley of the Kings, the scribe Amenophis left a graffito with his commentary about the depictions on the tomb walls. The inscription reads: "*Amenophis. In 1000 (is) beautiful, The Wedjat-eye to the right.*"(Romer 1975, 349). He thus states that a depiction of a Wedjat-eye to the right of the inscription is beautiful or even more beautiful than another depiction inside the tomb. Dialogues can also be indirect and not directly visible. Some graffiti may be a dialogue between the author and the authorities, since graffiti can be left as a reaction to punitive measures taken against the creators of graffiti (Lynn & Lea 2005, 59).Graffiti may also be left on places where older graffiti was already present without directly responding to the content of the earlier inscription. During the South African or Boer Wars, many soldiers left graffiti near or over earlier rock art left by the San people. These dialogues give further insight into contradicting or similar feelings and values of different authors from different places, times and cultures.

Times of conflict and war are often times of oppression, in which people look for alternative ways to express their hidden feelings. Among them are soldiers and prisoners. Graffiti is an ideal tool to be used by conflict archaeology. During conflicts, there is a constant state of lawlessness. Soldiers are free from domestic responsibilities (Howard 2001, 117). The boundaries of normal life faded and disappeared. This made it possible for them to freely apply graffiti wherever they liked. Since there would be no likely form of retribution aimed against the creators of graffiti in areas of conflict soldiers were often able to leave their name and a date, which makes it possible to identify the author and date the graffiti.

The Kilroy has become one of the most famous and internationally known depictions left by soldiers (Figure 9). They appeared in the Second World War at almost every place which had been visited by American soldiers. A Kilroy is a simple drawing of a face with a long nose and big eyes which is peering over a wall or fence, often accompanied by the text "Kilroy was here." It also had a Canadian Counterpart named Clem (Reisner 1971, 15). Many myths exist about the origins of the Kilroy. One of them states that an infantry sergeant named Kilroy was irritated by members of the U.S. Air force, who always

bragged about the exotic countries and remote places where they had been stationed. When they arrived at yet another remote station, a graffito there indicating that Kilroy had been there first (Reisner 1971, 13). It is believed that James J. Kilroy, a US Ship inspector who was ordered to count rivets at the shipyard, marked counted rivets with a chalk drawing stating that 'Kilroy was here' (Johnson 2005). There was also a British variation of Kilroy named Mr. Chad, which was probably invented by the British cartoonist George Chatterton in 1938 and may thus pre-date Kilroy (Shackle 2005). Whatever its origins may have been, the Kilroy is a form of what Blume calls sight-seeing graffiti (Blume 1985, 141). Sightseeing graffiti is a clear indication of marking and claiming territory. A Roman parallel to the Kilroy-style sight-seeing graffiti was discovered at Pompeii, where graffiti has been found stating that 'Decimus was here', or *Decimus hic fuit* (D'Angelo 1976, 103).

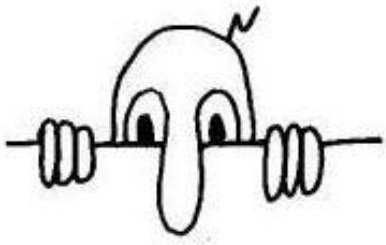

***Figure 9:*** Kilroy was here. A typical Kilroy-depiction (www.KillRoywasHere.org)

Soldiers left graffiti for a variety of reasons other than just claiming territory. Boredom and loneliness were common feelings that lived in the minds of soldiers (Edwards 2004, 1; Melton 2008, 4). Sudden intense emotions, the threat of death and the long periods of waiting called for a need of expression. Frustration and anger could also be vented through graffiti, as a caricature of a British sergeant-major in a stable at in Yorkshire illustrates. It was left there by horse lads, men living at farm to cultivate the land. After they had returned from the First World War, they drew the caricature with medals and a cross on its chest spelling "P.R.I.+.K.." (Figure 10**).** Dialogues in graffiti have also been created by soldiers. A soldier left a message saying: "*The Marine Corps thanks the USAF."* A member of the USAF replied by writing: "*You're welcome, jarhead."* (Reisner 1971, 191). Jarhead is military slang for a soldier of the US Marine Corps.

***Figure 10:*** Caricature of a Sergeant Major with the medals on his chest spelling "pri+k." Located at the Fox House at Birdsall, Yorkshire. (Giles & Giles 2007, 353).

Another good example of military graffiti is the so-called 'man versus empire stone' from Fauresmith, Southern-Africa. It is an inscription on a dolerite boulder depicting an armed man, a horse and a group of soldiers carrying a white flag. A text next to the armed man identifies him as "*Ik, P.J. v.d. Byl Lamprechts, 28.03.1907."* Mr. Pieter Johan van der Byl-Lamprechts lived at the nearby Vaalpan farm from 1879 to 1962 (Ouzman 2010, 16). A text near the horse says: "*Met ouw Sem."* The name '*Sem'* is branded onto the horse in the depiction. The figure of the armed man is marked with '*P.L.'* and his gun is marked with '*M.M.,'* a common abbreviation of the Model Mauser rifles used in the South-African wars, better known as the Anglo-Boer wars. The group of soldiers represents British soldiers surrendering themselves. Their commander is marked as being '*L.Robber,'* or Lord Roberts, the commander of the British forces. The text '*Koe ka Kakie hents op Bokkor of ik schiet'* is written next to the figure representing Lamprechts, while '*Plees sir'* is written next to the British soldiers (Ouzman 2010, 17).

In order to properly understand and 'read' this graffito its context has to be understood first. The presence of the gun, the soldiers, Lord Roberts and the age of Mr. Lamprechts date the representation in the depiction to the Second Anglo-Boer war which lasted from 1899 to 1902. The graffito was made after the war in 1907. Microscopic analysis has pointed out that the '7' in the date has never been a '2' and the date can thus have not been '1902.' The soldiers are holding a white flag and are surrendering to Lamprechts saying "Please Sir." The text spoken by Lamprechts has to be further examined. The word '*Koeka*' is used to mimic the sound of a Lee-Metford rifle. '*Khaki*' was the nickname used for British soldiers who had traded their distinctive red coats for khaki uniforms in the first Boer War (1780-1781). '*Bokkor'* refers to the British word 'bugger.'

The text, written in Afrikaans, thus says: "Bang, Khaki! Hands up bugger, or I will shoot!" The soldiers surrender themselves to Lamprechts. Lamprechts used this graffito to express his feelings of oppression. He places himself in an imaginary situation, which according to Ouzman is an expression of exploring the borders of alternative possibilities of place and personhood (Ouzman 2010, 32).

At Abu Simbel in southern Egypt inscriptions were left by Phoenician, Carian and Greek soldiers in their native languages (Darnell 2006, 12). Asiatics have left inscriptions in a dual-script, both Egyptian and their native language, at the Wadi el-Hôl (Darnell 2006, 9). Soldiers' inscriptions in foreign languages can be found throughout Egypt. Several inscriptions were left by Roman soldiers at Akoris in Middle-Egypt. Curvius Rufuce and Caius Rammius, centurios of Legio XXII Deiotariana, dedicated a stele to Serapis there and Trireme captains Herennius Straton and Aurelius Avitianus made dedications to Amon.[8] Without understanding a foreign language, the graffito cannot be understood. British soldiers left a graffito saying "We got mittens too" in a trench during the First World War, referring to the inscription on German belt-buckles saying : "*Gott mit uns"* or "God is with us." (Edwards 2004, 1). A coded graffito dated to 1967 has been found in a troopship heading to Vietnam. A U.S. soldier left his signature and home address written on the bottom of the sleeping-berth above his one in morse-code. It spelled out the name of R. Simpson from Plainwell, Michigan 9 Edwards 2004, 1).

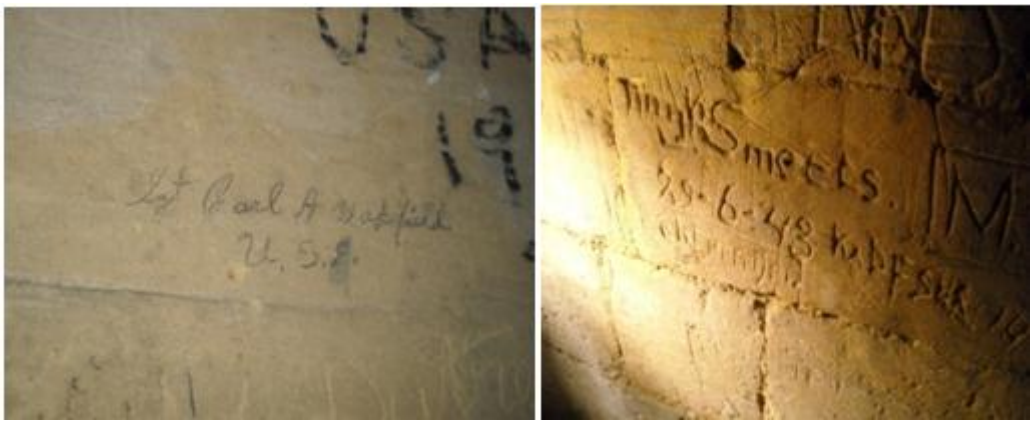

***Figure 11*:** Graffiti left by Sgt. Carl A. Wakefield when taking refuge in the Fluweelengrot in Valkenburg, The Netherlands during the Second World War (Left). War-time Graffiti left underneath the 18th century defence-works of Maastricht which were used as air-raid shelters during the Second World War.

[8] Personal visit to Akoris/Tihna el-Gebel on 05-12-2009.

The Yorkshire horse-lads left graffiti at the farms where they were employed. They were drafted from the farms to join the British Army in the Second World War and when they returned they left new graffiti there, showing their war experiences, like a landing-craft (Giles & Giles 2007, 353). Among the horselads-graffiti another military graffito was found at Foxhouse: "Sgt. Carr, 5th Lancers." This probably was no horse-lad, but a soldier stationed at the nearby barracks that helped the farmers when the horse-lads were away fighting (Giles & Giles 2007, 353). The graffiti and the persons and depictions, as well as their contexts should be properly studied before the actual graffiti can be dated.

Soldiers did not only leave graffiti on walls and structures, but also on pieces of military equipment, like helmets, jackets, artillery shells, signs, bunkers, airplanes, vehicles etcetera (Figure 12). The iconic nose-art on airplanes can also be regarded as a type of aircraft-graffiti. It is still common to write messages on military vehicles. A photograph by Anja Niedringhaus shows US M1A1 Abrams tanks performing exercises in the Kuwaiti desert with the message 'All the way to Baghdad' written on the main canon barrel of one of the tanks (Schwartz & Kuo 2003). Prisoners of War wrote messages on the walls and doors of their cells. This was often done to raise their morale (Reisner 1971, 45). Caves were often used as holding cells during the American Civil War (Melton 2008, 4). They were also used by soldiers to take refuge. Graffiti may also be left on trees. An example is a tree standing in Oosterbeek, the Netherlands. The inscription "*1st Airborne Div. Sept 44*" was carved in the tree during Operation Market Garden in 1944, probably by members of the British 1st Airborne Division (Figure 13).


***Figure 12***: Left: A line from the popular animation series 'South Park' is written on the side of a military vehicle in Afghanistan (left)(http://www.hertie-school.org). Right: A soldier in Vietnam counting down his tour of duty on his helmet, which also shows his identification number and blood type.(http://www.usmilitariaforum.com).

***Figure 13*:** Airborne graffiti in Oosterbeek, the Netherlands (Photo and facsimile by J. Golverdingen).

Inscriptions dating to the Civil War have been left at several structures which are standing still today in the United States, of which the Blenheim House in Fairfax city and the Brandy Station in Virginia are most famous. Brandy station was built in1858 and was used by both the Confederate and the Union troops as field hospital. It was located at the junction of the Orange and Alexandria railroads and roads and was situated near an observation point at Fleetwood Hill. At June 9th 1863 the battle of Brandy Station took place, including one of the most famous cavalry charges of the Civil War. Federal troops captured the house during the winter of 1863-64 and used it as a headquarters under Henry Price. Soldiers left a lot of graffiti at the second floor of the house, made with charcoal and pencils (Figures 14 & 15). The graffiti was discovered during renovations in 1993 and had been preserved behind the plaster on the walls. The first graffiti entry has been dated to mid-April 1863.[9] The Blenheim house, a farm built by Albert and Mary Wilcoxon in Fairfax City had been occupied by Union soldiers who were marching from Washington to Manassas in July 1861. Three floors of the farmhouse were covered with graffiti at the farm with the last entry being dated to June 20, 1863 (Jackman 2008). Most of the graffiti at both locations consisted of the names and units of soldiers, drawings and separate lists naming the members of certain units. These kinds of roll calls are common in soldier graffiti, but they have also been found with the horse-lads in Yorkshire, who also worked in close connection to other team members, just like soldiers (Giles & Giles 2007, 348).

[9] www.brandystationfoundation.com

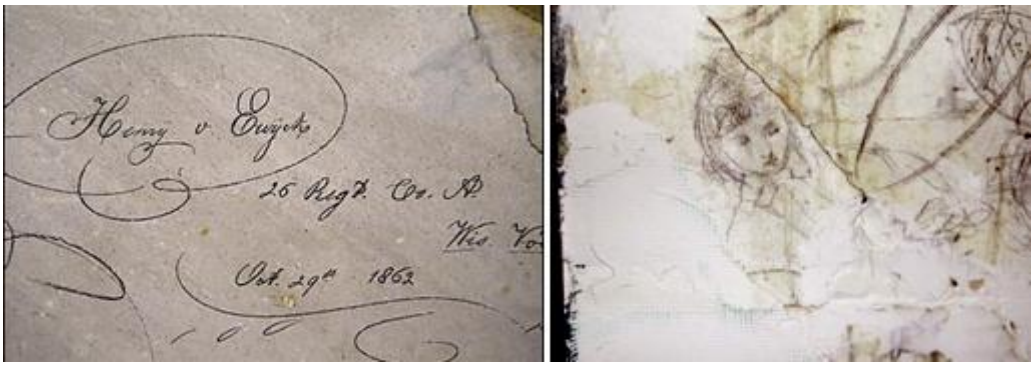


***Figure 14:*** The signature of Henry van Ewyck at Blenheim House (Jackman 2008.) and a drawing of a woman at Brandy Station (www.brandystationfoundation.com).

***Figure 15*:** Signature of Michael Bowman of the 7th Virginia Cavalry at Brandy station on the left and a picture of Mr. Bowman on the right. (www.brandystationfoundation.com)

Civil War graffiti had also been discovered on the inside of court record books from Prince William County in Virginia, taken from the county court-house in Brentsville by soldiers, probably Union troops. Soldiers left interesting information in these books about their personal lives. Andrus H. Holcomb of company battery L of the New York 1st Light Artillery left his name in an order book from 1778-1784, also naming his hometown Webster in Monroe County, his father Reverend Chester Holcomb and his future bride, Miss Electra Jane McKee. The Dumfries District court-book held the message: "*Rescued from the flames of the burning building by the 145th Pennsylvania Volunteers, June 1863"* (Cain 2003, 80). Some inscriptions in the Blenheim House were not written in English, but in Dutch and German, like a message and signature left by the Dutch immigrant Henry van Ewijck who served with the 26th Wisconsin Volunteers (Jackman 2008).

Soldier graffiti mostly consists of signatures or names, personal numbers, regiment name and number, dates, drawings, messages, names of people at the home-front and depictions of military life, like musical instruments, weapons, equipment, vehicles, horses and soldiers. Depictions of military culture have also been found in South-Africa, near earlier depictions of the San-People (Ouzman 2010, 15). It can provide personal information about soldiers and their units. Egyptian rock inscriptions from the 11th dynasty already provided information about the composition, equipment and travelling routes of expeditions (Darnell 2006, 8).A Middle-Kingdom Egyptian inscription was found near the Semna fortress in Nubia and is believed to be a landmark used by patrols (Darnell 2006, 2). Graffiti proves that a certain unit or an individual from that specific unit was present at the place where the graffiti was left. It verifies the presence of units that are named in official accounts.

Official military accounts written by officers and generals are often censored and are subject to intensive gate-keeping. Graffiti however is directly left by a soldier and can give insight into the soldier's own *habitus* (Ouzman 2010, 16). Furthermore, graffiti shows hidden emotions and personal thoughts of soldiers. The soldiers of the 4th New York cavalry wrote at Blenheim House that there was: "*No money. No Whisky. No friends. No rations. No peas. No beans. No pants. No patriotism"* (Jackman 2008). Anti-war messages have also been written by soldiers, like "*You're the one who must decide who's to live and who's to die. You're the one who gives his body as a weapon of the war—and without you all this killing can't go on"* (Edwards 2004, 2). Graffiti also provides information about the living conditions and experiences of soldiers. Many objects that are found in the permanent and archaeological record may contain graffiti. This makes graffiti a unique medium which can be recovered archaeologically and which can provide insight into the personal thoughts and minds of the soldiers who once fought at the battlefield, giving them a name and when possible even a face.


***Figure 16:*** "With Best Wishes" is written on the bottom of an artillery shell during the First World War (Saunders 2004, 32).

### 2.5 Concluding Remarks

The documentary record is huge and contains many kinds of writings and depictions. Studying all of them would be irrelevant and impossible. This paragraph was meant to illustrate the diversity of documentary sources available to the conflict archaeologist, their importance and the associated problems and precautions which need to be taken when studying them. The strict division between history and prehistory and between historical archaeology and prehistoric archaeology should be avoided in the study of conflict archaeology. All available sources should be used by historians and archaeologists alike in an interdisciplinary fashion to re-construct the events from the past. The conflict-archaeologist therefore will also partly be a military historian and *vice versa*. The importance of both archaeology as well as documentary sources should not be ignored. They are all pieces of the same puzzle of the past. Many iconographic sources for example have been used to identify objects recovered by archaeological excavation. Likewise, many artefacts have also been used to identify objects which were depicted in the iconographic record.

# Chapter 3: The Visibility of Conflict

*"Sound, sound the clarion, fill the fife, throughout the sensual world proclaim,*
*one crowded hour of glorious life is worth an age without a name"*
- Thomas Osbert Mordaunt

These lines from the poem '*The call',* written during the Seven Years' war by Mordaunt (1730-1809) excellently express how the few hours of battle could have a dramatic impact while leaving many 'nameless' dead. Historic conflicts like battles or skirmishes in the past are often short-term events, often lasting for only several hours, yet evoking the deep emotions of those who were involved with the conflict and leaving a deep impression on these people. However short a battle in the past may have been, it also left a large material impact on the surrounding landscape , e.g. the bodies of the fallen, gear and weapons left behind, fortifications, impact craters of artillery, burnt crops and houses. Of the total artefacts scatter on a given battlefield most of the separate artefacts have been looted over time or have disappeared over time. Only a small amount of the total scatter of artefacts has entered the archaeological record, becoming invisible at the surface. Some of the artefacts disappear due to post-depositional processes and contemporary looting by amateur-detectorists and treasure-hunters.

Even a short-lived battle may however have left permanent marks in the landscape which are currently still visible. Structures, especially defensive ones, are often even still standing in the landscape. Just like other human actions, conflicts and battles leave traces in the landscape and the archaeological record. Some of them were intentionally made, like fortifications, while others were left by coincidence, like the scatter of bullet cartridges left by a soldier who fired his rifle. Modern development projects, degeneration due to neglect, expanding human habitation and agriculture are currently threatening these traces of conflict.

This chapter will deal with specific material manifestations of conflict which are of interest to the conflict-archaeologist and their visibility in the archaeological record and beyond. This 'visibility of conflict' will determine the degree and representativeness of available data and thus the effectiveness of conflict- archaeological research. Each paragraph will deal with its own subject, in which current issues, methodology, representativity and importance are studied. Human remains and their associated contribution to the study of conflict-archaeology will be discussed in the following chapter. Appendix B will provide detailed background information regarding trauma. Before studying these categories of evidence it should be noted that not every aspect of a conflict can be studied by military historians, nor by archaeologists, since most aspects of

these conflicts escape the scope of the written and the material record are lost in history (Lee 2007, 14; Vencl 1983, 130).

One of the best indicators of armed conflict is the presence of armament: functional weaponry which can be effectively used in combat. A weapon can be defined as: *an artefact aimed at defeating or destroying opposing forces and structures by disabling or killing opponents, causing trauma or structural damage often but not always being applied in offensive and defensive combat.*[10] Weapons can be classified in numerous ways and a huge arsenal of weapons has been created throughout human history. It is nearly impossible to study every weapon made by man, but a comprehensive work, '*Weapon*' has been published on the subject (Holmes 2006). In archaeology weapons are mostly studied in relation to the local, temporal and archaeological context in which they are found. An example is the detailed study of bows and arrowheads found at Dura Europos (James 2004, 191-230). Most information about weapons and archaeology can thus be found in publications referring to specific projects in which the weapons were encountered. An important publication about archaeology and weapons in general is Oakeshott's '*The Archaeology of Weapons*' in which the author studies the development of weapons from prehistory up to the late Medieval period, including daggers, swords, maces, pole-arms and bows (Oakeshott 1996). A complete publication about bow and arrows has appeared in the shape of Webb's *Archaeology of Archery* (Webb 1991). The full potential of weapons as archaeological artefacts cannot be discussed in this thesis since the subject is too comprehensive to be contained in this thesis. Some types of weapons however will be referred to in relation to the subjects discussed in the following paragraphs and appendices.

### 3.1 A landscape of conflict: The site and its setting

When studying a battlefield, one has to be aware of what Saunders call the 'landscape of conflict' surrounding the battlefield (Saunders 2001; Connor 2005). The place where a battle itself ultimately took place can be treated as a site, but it is part of a wider landscape that functions as a container for multiple archaeological sites (after Carman 2005, 219). A site can be demarcated physically by a fence or a river and its border can be drawn on a map, where this is not easily possible for the surrounding landscape. A battlefield is dynamic and it is very hard to determine where the edges of the battlefield actually should be located when trying to map the field. Therefore it is better to recognize several areas of archaeological interest within this landscape which can be designated as archaeological sites related to the battlefield.

[10] Definition by author.

A landscape of conflict is not, as Saunders states it: "*inert, an empty backdrop to military action*" (Saunders 2001, 37). The landscape initially exists out of the physical structures and spaces which make up the environment, a geological terrain with is associated features like forests, settlements and roads (after Williamson 2009, 137). Every feature present on a battlefield during the actual battle may have had a function or purpose in the battle itself. The houses and shelters in a landscape may have been used to house troops. Camps and parks for baggage trains were located within the landscape and the roads were used for transport toward and away from the battlefield. Auxiliary troops may have been stationed in villages or farmsteads and fields and buildings may have been plundered or deliberately destroyed. All these features belong to the surrounding landscape of conflict. Angelos Chaniotis wrote that when travelling through Hellenistic Greece one would travel through "*...a landscape marked by war*" (Chaniotis 2005, 1). War-torn landscapes are characterised by destruction (after Saunders 2001, 39). It may contain burning fields, plundered villages, wreckages of vehicles, destroyed buildings, but also the remains of dead humans and animals both military and civilian, impact craters, roadways and causeways, cemeteries etcetera. Many different these aspects may be recognised in the archaeological record.

The landscape of conflict is not only manifested in physical objects, but also in what Daniels and Cosgrove refer to as 'cultural images,' graphic and written representations of the landscape which create a mental concept of the landscape and which deal with abstract concepts like 'memory' or social relationships within the physical landscape (after Daniels & Cosgrove 1988, 1). Graphic and written representations of conflict have been discussed in chapter 2. These abstract concepts are manifestations of the way in which a landscape is experienced. The contemporary inhabitants have different associations with the landscape in which they are living and expressing agency. They create memories of the landscape, impressing it with social and emotional values which are only recorded partially in documentary sources, being invisible to the material record.

Saunders states that: "*Architecture of matter can embody memories and memories can stimulate the production and shape of matter"* (Saunders 2001, 38). He illustrates that the landscape of conflict exhibits a strong relationship with the people who fought, lived and still live in it, a landscape which is recorded in memory, matter, depiction and writing. Memory, especially the memory and remembrance of the dead which are related to a conflict evokes a strong emotional bond with the landscape. A battlefield on which many people died may thus turn into 'hallowed soil.' The morphology, social landscape and ecology of a landscape have all been influenced by the conflicts that were fought there (Lynch & Cooksey 2007, 25). All these functions of the landscape have to be taken into

account when studying a particular battle, since military operations affect the landscape as well as they are affected by it. It remains however impossible to determine how far an initial battle reached into the surrounding landscape in its full extent.

### 3.2 Defence-works: From Fence to Fortress

The presence of defence works in a landscape is a good indication for some kind of conflict which is or was at hand within this landscape. Their presence on itself implies some sort of conflict, since they serve as boundaries, dividing the area on the inside of the defences from the exterior world. These defence works however do not specifically have to be an indication of armed conflict. The most functional aspect of defence-works is protection or defence against some hostile force. This can be an enemy army but also another threat in the shape of dangerous animals or a natural force like an avalanche. Next to this functional aspect defence-works also carry a symbolical and ideological meaning. They are lines of demarcation which are often clearly visible. They demarcate certain areas and line borders which may be actually present, but also symbolic lines. They are a symbol of protection, of power and often also of status (Lynch & Cooksey 2007, 183). Some defence works have a primary symbolical function and may thus not be included in the field of conflict archaeology.

Whenever defence works are specifically designed to protect against armed combat they are however a subject of conflict archaeology. These defence-works often combine defensive with offensive capabilities, making it possible to deploy armament against an attacking force. These defence works may however carry a secondary symbolical function. City wall for examples discourage hostile forces to attack. The walls inspire awe in the observers by their size and construction and the power of the city, its wealth and its social status are well visible in these walls. After all, this city had the man-power and the resources to build an impressive wall, which also makes the city appear impregnable. It is important to understand these symbolical and ideological functions of defence-works next to their purely functional aspects in order to fully appreciate their significance. Defence-works can thus be defined as follows: *man-made features, intentionally created to protect and demarcate a certain area or object, either factual or symbolical against threats and hostilities of any kind, either physically present or mentally constructed and to withstand or avert attackers, often also carrying a symbolic or ideological function.*[11]

Defence-works may be either passive or active. Passive defence-works are unmanned, like walls, ditches, fences, minefields, wire and barriers. Active fortifications are designed to be occupied by troops, giving these defence-works an offensive capability.

[11] Definition by author.

Walls with palisades and embrasures are good examples, but artillery positions and complete fortresses also belong to this category. Active defences can be armed with weapons, like ordnance and small arms. A further distinction can be made between static and dynamic defence-works. Static defence-works are built in a particular position which is to be held against enemy attacks. It is often built along a line of defence which is not meant to change position. These defences are built to permanently last. Dynamic defence-works however are of a temporary nature and they are often constructed in a dynamic battle to shelter troops moving along the battlefield, sometimes even in the direction of the enemy, becoming offensive defence-works.

Defence works appear in many shapes and sizes. The simplest forms of defences are the natural features which are already present in a landscape of conflict. Natural defences for example are present in the shape of ridges, river beds, large rocks and trees. Other possible defences can be walls, hollow roads, civilian buildings and other man-made features in the landscape. Soldiers on a battlefield often seek for these kinds of positions in which they can take a defensive stance. When the enemy forces are too numerous or too well armed the defender will have to enhance his defensive position by building fortifications: man-made military structures aimed at defending and resisting against an opposing attack. Small-scale field-fortifications are often occupied for a short time and they must be quickly constructed with minimal effort, often during or shortly before battle. They are temporary defences with a dynamic character, often quickly disappearing from the landscape after they are abandoned. They do however remain visible in the archaeological record. Field-fortifications are often constructed by digging or by using simple material like wood. A small, temporary wall has been found in the archaeological record on a slope overlooking a Roman marching route in the Oberesch region at Kalkriese. It may have been used as a defensive position by German tribes who ambushed Roman soldiers marching by as part of the so-called Varus-battle in the German Teutoburger Wald (Moosbauer & Wilbers-Rost 2009, 57).

Simple pits in which soldier can hide have become known as ‘foxholes.’ Foxholes can be interconnected with trenches, creating a trench-system. This happened in the First World War, since the invention of the machine-gun made it impossible for the warring parties to advance any further, resulting in a stalemate (van Gilst & Kooger 2007, 210). Trenches, foxholes, artillery positions and other dug features are often encountered unintentionally during archaeological projects or geophysical surveys when looking for older archaeological remains. The remains of these dug-out features, often belonging to the First and Second World War can still be found in many forests, where they have escaped modern cultivation and landscape-management, making it possible to study them in-situ

(Figure 17). The edges of the trenches are often eroded and the features have been filled with soil again, but due to compression of the soil they are still visible as depressions in the landscape. Archaeological research was undertaken to study these kinds of field-fortifications from the Battle of the Bulge in the Ardennes Forest (1944-45). A survey was undertaken in St.Vith-Schönberg area, Belgium in 2007 in which 116 dug features were recorded (Passmore & Harrison 2008, 94). The project intended to study the temporary fortifications as part of a dynamic battle-development, providing insight into the troops' dispositions and their relationship to the terrain and the course of battle (Passmore & Harrison 2008, 89).

***Figure 17*:** Trenches from the Maas-Rur Stellung, a part of the Westwall built in 1944, still visible in the Elmpter Wald near the Dutch-German border (After M. Seltmann, http://7grad.org/Exkursionen/Westwall/Maas-Rur/maas-rur.html).

A project focusing on trench-systems from the First World War took place in 2007-2008 at Ploegsteert in Belgium. A gradiometer survey was undertaken and supported by aerial photographs it became possible to discover and map trenches, impact craters, iron sheets and parts of bunkers. These trenches were however more permanently occupied and they evolved into a static line of defence. Many features of these trenches are however not visible on photographs due to camouflage netting, just like the modern woodland canopy 'camouflages' the trenches in the present day (Master & Stichelbaut 2009, 282). Excavation of trenches, foxholes and associated features can reveal some interesting data. Artefacts may be recovered from trenches, fox-holes or impact-craters which were also used as cover. Pieces of ammunition and cartridges, pieces of equipment and even human remains may be found in these features. By sectioning a trench the orientation of fire may be reconstructed. When a trench was dug the soil was often used to create a small *talud* or slope leading up to the trench, also forming a small wall which provided additional

protection to the men in the trench. This slope will indicate the direction of fire. Trenches often had a zig-zag pattern to prevent enemy forces from having a direct line-of-sight and line-of-fire when entering the trench. Zig-zag pattern soil-marks may thus turn out to be trench-systems. When trenches were occupied for a long time they were better fortified with wood and metal, turning into static defence-lines which often evolved into a system of different defences, including permanent and temporary small- and large-scale features.

Static defence-works are often used as demarcation-lines, reinforcing natural defences or replacing them where no natural defence-lines are present. The simplest and oldest kinds of static and passive defence-works are ditches, hedges and walls. These kinds of defences are often not visible in the archaeological record themselves, but post-holes from the fence-supports can often still be detected. Earthworks are however often still visible in the landscape, like so-called *Landwehre*. A *landwehr* is a long earthen embankment which could be reinforced with fences and natural hedges. They were used in the same way as the fences and hedges mentioned above, but their main purpose was a military one: to prevent and hinder enemy movement (van Gilst & Kooger 2007, 226). In 1874 J.F. Glidden from Illinois received patent on his newest invention: barbed wire (van Gilst & Kooger 2007, 246). Barbed wire saw extensive use in agriculture, still being in extensive use today, but it has also been used extensively for military purposes. It can still be found in the archaeological record across the world and in many kinds of excavations.

### 3.2.1 Lines of Defence

Small-scale static defences were also built as static and more permanent defence-works or as part of a permanent line of defence. This is reflected in the durable and often more expensive materials used for their construction, like stone or concrete. One of the best examples is to so-called bunker or pillbox, a wooden and later concrete structure, often partially underground which provides shelter against heavy attacks and which is often armed with ranged weaponry. Bunkers can still be found in many landscapes of past conflict. In many European countries they have been turned into monuments. Collapsed or buried bunkers may be located and excavated by archaeologists. Artefacts and human remains may be preserved in-situ inside these bunkers.

Static defences were often part of larger defence-lines made up out of small-scale fortifications including concrete trenches, larger underground shelters, anti-tank-ditches, artillery and anti-aircraft positions. These kinds of defence-lines were extensively built during the second World War and consisted of integrated defence-works. These defence-lines have provided a wealth of information about defensive architecture and its associated infrastructure, which have all left archaeological traces in the shape of stone foundations, wooden remains, soil-marks, roadways and artefact scatters. Artefacts, grave-monuments and other objects associated with Roman military and civilian life have also been found extensively along the *limes Imperii*, the borders of the Roman Empire. Some examples are the Great Wall of China, the Roman *limes* and Hadrian's Wall, the *Hollandse Waterlinie* in the Netherlands, The Maginot line, The Atlantikwall (from France to the Netherlands), the German Westwall (or Siegfried-line).

A recent project indicating the potential of studying these defence-lines has been undertaken at Pointe-du-Hoc, the best preserved part of the Atlantikwall that was stormed by the US 2nd Rangers during the D-Day landings in 1944. An interdisciplinary team of archaeologists, geophysicists, geologists, architects, construction science engineers and drawing artists surveyed the site, took measurements, located structures and craters and investigated buried and underground features (Burt et al. 2007, 384, 390). Research has also be undertaken concerning the preservation of the concrete on-site (Wattenburg Komas & Burt 2009). The importance of using documentary sources in conflict archaeology is reflected in the Pointe du Hoc project, which based its research proposals on the wealth of documentary information that was available, like aerial photographs, topographic reports, interpretation reports, action reports of the battleship Texas and reports gathered during bombing missions (Burt et al. 2007, 385).

Ground-penetrating radar, magnetometry, electromagnetic induction, metal detector surveys and pedestrian survey were undertaken to locate underground features. Trench systems and emplacements for 155mm artillery, as well as many impact-craters visible on aerial photographs were to be located.(Rolf 1998, 202). The craters have severely damaged most of the trench systems , but empty and concrete underground spaces were detected and a lot of metal objects have been recovered (Burt et al. 2007, 392). A lot of metal was classified as ordnance, which is not strange since from April 25, 1944 onward the site was bombed intensely and on June 6th of the same year it took a heavy pounding by Naval bombardment being followed by the Ranger assault in which small arms were used (Wattenburg Komas & Burt 2009, 44). The defenders used machineguns and other small-arms to defend their fortified positions and ammunition and cartridges were probably scattered around the site. The underground features and remains of trenches

which were discovered are to be excavated, unexploded ordnance is to be cleared and excavation of anomalies will be undertaken in the future (Burt et al. 2007, 396). The archaeological research at Pointe du Hoc does not only focus its questions on the past, but also on how to create an authentic experience for present-day visitors to the site, investigating the past for the future.

One of the most famous defence-lines in the world which carried and immensely strong and well defined ideological meaning is the Great Wall of China, which has been extensively researched, including the infrastructure around the wall (Yang 2004). A recent example which is also very well researched is the former Berlin wall. It was a direct product of the Second World War and the following division between a capitalist West and a communist East, dividing the city of Berlin in half. The wall visually marked the physical and immaterial end of the 'Western World' and it was regarded to be the first line of defence against the 'threat of communism.'

In fact, the Berlin wall consisted of a network of multiple walls, just like the Great Wall of China. Culture-historians and archaeologists at first thought the wall would be opened up, but left mainly intact to decay (Dolff-Bonekämper 2004, 239). Some parts of the wall were kept intact and markers were placed to indicate the former location of the wall after it was torn down. So called *mauerspechte* or wall-peckers removed pieces of the wall to sell them to tourists and even President Reagan removed a piece of the wall (Aanderud & Knopp 1991, 24; Dolff-Bonekämper 2004, 244; Baker 1993, 720). It also became an important carrier of graffiti. After more than two decades the wall has almost entirely disappeared. Baker however already noted in 1993 that: "*For archaeology, the study of material objects in a historical perspective, contemporary material objects, especially those of complex meaning and history like the Berlin Wall, are as valuable as the older border fortifications of China or of Northumberland"* (Baker 1993, 709). The Berlin Wall has fallen into the field of archaeology since it is a closed chapter of history leaving material remains, just like most permanent and static defence-works which are still visible today.

Ronald Klein Tank has started a survey project of the visible remains of the Berlin Walls in 2001, including photographs which can be accessed online using a digital map of Berlin, a chronology of the wall up to the present and detailed background information.[12] Most of these traces have been partially buries and have entered the archaeological record this way. Some of them are actual defence-works, like concrete foundations and blocks, remains of electrical and barbed wires and pieces of fences. Other remains are scattered artefacts including pieces of signs or military equipment like light flares.

Permanent defence-works which are still visible in the landscape are another indication of the integration between the field of the traditional historian and the archaeologist which can be observed in conflict-archaeology. Archaeological investigation concerning these lines of defence aims at answering questions about the construction of the lines, their life during their occupation, the eventual breaching or capturing of the lines and their post-depositionary life. But it also investigates the socio-cultural impact of the defence-works and the human lives associated with them, as well as their symbolic and ideological power, stretching far beyond the material remains alone.

### 3.2.2 Castles and Fortresses

Ideology and the reflection of power are secondary functions of many defence-works, but they are never as clearly visible as in the construction of castles. Castles belong to the domain of conflict-archaeology since they are defence-works which are used to defend their occupants against conflicts, but other fields of archaeology, especially medieval archaeologists are equally interested in castle remains. Castles are however extremely complex structures, since they do not only have a possible military function, but a social one as well. Castles were often centres of local power and administration, serving as the seat of a landlord in the medieval feudal system or the seat of the local ruler of a city-state for example. They were often reinforced houses to defend the household from external threats. Ronne argues that its primary defensive function however is not a characteristic quality of a castle, but that it is integral to the residential function (Ronnes 2006, 37). Castles are typical for the Medieval period and its social structure, but they have also been built, expanded or modified during later periods.

[12] http://berlinermauerspuren.de

A castle can be defined as: "*a reinforced, high-status structure which combines accommodation of a household with the presence of defensive features, often serving as a centre of local power or a military strong-hold and with other secondary functions depending on the occupants and the intended function of the structure other than a purely military purpose.*"[13]

Because of their special purpose as local centre, castles are often associated to the villages and other features in the surrounding landscape. The importance of the castle thus outranges the physical space it occupies. Johnson mentions that castles have often been studied form an architectural or military-historical angle, ignoring the residential and social landscape in and around the castle terrain (Johnson 2006, 156). In the sixteenth century nation-states arose in Europe, making local ruling elites and so-called *gefolgschaften* obsolete. Castles lost their strategic function and their military significance was quickly rendered obsolete after the steady introduction of firearms including the canon (van Kempen & Horn 2005, 8). Many castles were either besieged and destroyed or abandoned, falling into ruin. Other castles were purposely destroyed because they lost their significance or the deny access to them by enemy forces. William III of Orange for example destroyed castle Valkenburg in The Netherlands in the 17th century to prevent the French armies from capturing it. Most castles have become invisible after they were abandoned, but their remains are often still present, buried in the archaeological record, becoming the domain of the archaeologist. The archaeological remains may consist of motte-hills, building foundations, building debris, soil-marks of left by wooden constructions, moats and artefacts including objects from the daily life at the castle as well as weapons and armour. Coring, trial-trenching and especially geophysical research may be used to investigate the castle remains.

Whenever a castle was used in defence against armed combat or when it was occupied by armed troops it becomes additionally interesting to conflict archaeology, since it is then used as a garrison. The military function of castles was gradually adopted by the emergence of fortresses, sometimes being located on the location of an earlier castle. The fortress is the ultimate form of fortification. It is a building specifically aimed at military defence, often with strong offensive capabilities. A fortress can be defined as "*A closed, self-reliant defence-work with a military character which is defendable from all sides facing possible attackers and which can be used for permanent military occupation*." Unlike castles, fortresses have a military function and are mainly occupied by a garrison of soldiers, although civilians may have also been present. Fortresses come in many sizes

[13] Definition by author.

and shapes and they are often related to other defence-works in their vicinity, like city walls and bastions. They are often self-reliant, which means that fortresses have their own supplies of food, water, equipment, weapons, ammunition and a stationed garrison and can thus function totally independently while withstanding an enemy siege or attack.

Fortresses have not solely been built from the sixteenth century onward. Defence-works like hill-forts were already built in prehistory. The Roman Empire was littered with *castella* and fortresses and the Egyptians built many fortresses in occupied territories, like the large fortresses of Buhen and Semna in Nubia. These fortresses were permanently occupied by a military garrison and were often used to guard borders and trade routes. Roman fortresses were a symbol of military presence and control over a certain area and they were used to maintain a security system, also regulating taxes supervising engineering works. In Egypt these fortresses mainly served to prevent revolts (Alston 1995, 74). Some fortresses included a small settlement in which civilians lived and they may have had a function as centre of power and administration, like castles. Their basic function was however not of a residential nature, but of a military one which distinguishes them from castles.

A good example is the Tell Sabi Abyad in Syria. The remains of an Assyrian Middle Bronze-Age fortress were discovered here. The fortress or *dunnu* consisted of a large tower, probably with a military function, with fortifications and a small settlement for personnel and soldiers. (Akkermans 2006, 201, 205). It was a military outpost which functioned as a guard post and an administrative centre as well, but it differs from a castle because of its primary military function. The application of correct definitions and terminology is important when studying defence-works. Castles are often called ‘citadels’ of ‘fortresses,’ but these terms do only apply when the castle indeed functioned as a fortress or part of a citadel. An example of this is the town of Shayzar in Syria, which is often referred to as a ‘castle’ or ‘citadel,’ but which in fact is a fortified town (Tonghini 2010, 209-210). Fortified towns should also not be referred to as fortresses for example. Many fortresses however have seen multiple functions during their use-life.

### 3.2.3 Protecting the civilian.

Defence-works have not only been used for military purposes, but they have also been built to shelter civilians in times of conflict. Simple lines and perimeter fences, *landwehre* and simple earthworks were usable when trying to defend small villages or single buildings but they provide insufficient security and defence for areas housing larger populations, like towns and cities. Defensive walls specifically constructed around a city as means of defence were often constructed out of stone or other strong materials. The oldest archaeologically attested city walls in the world have been discovered at Jericho, dated to 6000 BC ( Kenyon 1957, 65-66; Wheeler 1956, 17-18). A rock-cut ditch was found outside the wall which was built out of large boulders. City-walls have evolved over time adapting to the technology which was developed to bring them down (Harrington 2005, 97). Over time city walls were reinforced and they generally became lower, thicker and wider, making it possible to install artillery on top of them. Ding towers evolved into bastions which became multi-edged and elaborate systems using smaller defence-works, moats, covered roads etcetera were applied between the fifteenth and eighteenth centuries, making it possible to defend cities against large groups of attackers by applying multiple lines of defence before the wall could be reached (Baalbergen & Hoof 1999, 26).

Many stone defence-walls have been removed from around modern cities and towns, especially when the cities expanded beyond the walls. A succession of walls may be found during archaeological investigations in cities and towns, marking their former boundaries. They can thus be used as indicators of town expansion. Parts of the walls may still be standing upright and they are often protected monuments. Walls have often been torn with their stones taken as spoils and being used in new buildings. Foundations and underground tunnels belonging to the defences often remain left behind in the archaeological record and they can still be studied. In Maastricht, The Netherlands, a large part of the mine-galleries and tunnels underneath the former city defences remain intact (Baalbergen & Hoof 1999, 133). The course of walls can often also be traced back by using historical maps and undertaking coring campaigns. Wooden walls however will often only be visible as soil-marks and lines of post-holes.

Parts of former city walls and defence-works are often encountered when looking for older traces or when carrying out a preventive excavation. A preventive excavation in Roermond, The Netherlands for example uncovered a ditch with remains of a bastion with a *termine post-quem* dating of 1671. The stratigraphy changes its orientation in the section at a given point which may be related to the modernisation of the bastion as

visible on a map from 1782 (Boer 2006, 7). Several 18th century artefacts and pottery were found near the bastion. Other projects may be specifically looking for parts of defence-works like the RAAP investigation in Stevensweert, The Netherlands. The moats and structures of former defence-works were discovered through coring (Geraeds 2002). The original locations of both former defence-works discussed above were characterised by gravelly clay-deposits and the visibility of a ditch or moat in the section.

The appearance of large defence-works is a good indication for permanent settlement and a degree of strategic and general importance of this settlement. According to Kathleen Kenyon the appearance and building of large walls also indicates efforts of community organisation and surplus production (after Kenyon 1957, 66). City walls are often ignored by archaeologists since their location is visible on existing maps and documents. These maps may however contain errors and images of the walls may be incorrect. Towns without city-walls, especially large farms and settlements located in the countryside often had other means of defences than large walls. Whenever a threat arose in the countryside civilians and soldiers needed places to retreat to. Good examples of such places are sconces. Sconces are *independently constructed earthen fortifications, often with moats which are used for defensive purposes and shelter and which are often not permanently occupied*. They were already used during the Iron Age in Europe (Keijers 2009, 7). Civilian sconces were used by local people who could take animals and supplies with them into the sconce when a threat arose, walling themselves in and waiting for the threat to pass. Other sconces were used for military purposes. They were sometimes expanded by using stone walls or earthen bastions, turning into a small but well fortified position with offensive capabilities. Some sconces were equipped with drawbridges and gates. They may still be visible in the landscape as small elevated dikes or pieces of land circled by a moat. Sometimes they have completely disappeared and can only be recognised as soil-marks when being excavated. The construction of sconces was an intensive communal effort and it indicates local organisation of communities (Keijers 2009, 35).

In the Second World War many cellars and basements were turned into shelters to protect civilians against air-raids. Other subterranean features like tunnels, subways, sewers and caves were also used as air-raid shelters. Concrete bunkers and specialised air-raid shelters were also constructed and they can still be encountered in the archaeological record. Local castles, hill-forts and other fortified places may have been used as places of refuge and shelter during times of threat. They are indications of communal efforts to create safety when permanently settling in an area. The study of defence-works is therefore not limited to a specific site or to military actions alone, but they also reflect a strong relationship with the landscape and the communities living in that landscape.

### 3.2.4 Siegefields

A relatively new and largely unexplored part of the study of defence-works is the archaeological study of sieges and siegefields. Other than battles, sieges were long-term events of attrition which could last for hours, days, weeks, months or even years (Harrington 2005, 93). Sieges consist of several elements. First of all there is a fortified structure which is to be besieged, housing defending troops or a garrison. Secondly there is the besieging force which is located a distance away from the structure. The besieging force has its own houses, camps, workshops and possible lines of defence used for the *circumvallation* of the structure, denying access of supplies and relieving forces to the structure and blocking eventual escape-routes. Thirdly there is the actual siegefield located between the besieger and the structure. Trenches, approaches, artillery positions, screens and blinds, underground mine-tunnels and counter-mine tunnels as well as siege-craft and machinery may be encountered here. Finally there are the internal defensive elements of the besieged structure itself, like perimeter walls of the structure, bastions, defensive trenches, gates or watchtowers which may show traces of destruction when being besieged or breached.

The best archaeological remains of sieges may be the damaged defence-works themselves. The damage and later repairs may still be visible in the walls. Breaches in the walls may also still be visible (Figure 18). The Sassanian siege on the Roman occupied city at Dura Europos in Syria has been reconstructed by exclusively using archaeological material (James 2004, 30). An assault glacis, mines and counter-mines and wall collapses due to mining have been discovered, some containing skeletons dated to the siege around 256 AD (James 2004, 33-36). The remains of many defending Roman soldiers and a single Sassanian besieger were found within the remains of these mine-tunnels. The Sassanians may have used sulphur-dioxide to kill the Roman soldiers, applying chemical warfare for the first known time in history (Patel 2010, 26). Siegefields may contain impact marks of ammunition and siege-machinery on defence-walls as well as other structures behind the walls. Residues of occupation inside bastions and defence-works as well as graves and human remains of both besiegers and besieged may be still present in the archaeological record (Wiggins 2003, 102).

***Figure 18*:** Left: Breach in the city wall at Dura Europos, Syria due to mining activity. Right: A mine-tunnel at Dover Castle in Kent associated to the siege of 1216 (After Wiggins 2003, 16).

Siegefields themselves however may still be littered with traces of the siege. Trenches and approaches may still be visible in the archaeological record as soil-marks, but they are extremely rare since many siegefield are overbuilt or heavily disturbed. The trenches may also have been backfilled already after the initial siege. Moats and ditches may be better visible. Evidence for mining like craters left by exploding mines may still be visible, like the huge Messines-craters left in the landscape around Ypres, now filled with water and functioning as ponds. Actual wooden remains used to support mine-galleries together with digging materials and remains of mine-tunnels have been discovered in 1990/1991 at King John's Castle, Ireland (Wiggins 2003, 36). When cut into rock or stone actual siege-tunnels may be preserved like a tunnel at St. Andrew's Castle in Fife, Scotland (Wiggins 2003, 26-28). Near Maastricht a so-called *redoute*-line was discovered, first being visible as crop-marks. Further investigations indicated that it should be ascribed to the siege of Maastricht in 1748 and it was constructed to protect the besieging forces against an attack from the rear during the siege.

Artefacts and debris however may be scattered throughout the siegefield including munitions and equipment. Camps may be located by looking for refuse-pits, bullet melting kilns, graves and artefacts reflecting camp life (Vanderbeken & Wesemael 2010, 81). Another important discovery related to an earlier siege of Maastricht was done near Borgharen in 2010. A mass grave of horses was discovered here.[14] A metal-detector survey may be used to locate these artefacts. GPR surveys may actually be undertaken to detect remains of sieges. The research of siegefields is however difficult in urban areas

[14] Personal communication with Dr. A. Simons, Hazenberg Archeologie. 17-02-2011.

due to heavy disturbances. Rural sites and isolated castles may provide better preserved archaeological data about sieges. Wiggins mentions photo-surveys, landscape investigation, study of existing remaining structures, metal-detector surveys, GPR surveys selective and excavation of anomalies as possible methodologies for investigating siegefields (Wiggins 2003, 112). Aerial photography can also be added in some instances.

Defence-works have an important value for the conflict-archaeologist. They imply a threat or a conflict situation by their sheer presence, but they go beyond the purely functional and their physical presence. They reflect physical or immaterial boundaries, power, ideology, wealth, status, military innovation, city development and expansion, social organisation and constructed safety. They may contain graffiti and artefacts, giving a deeper insight into both military and civilian life. Studying and preserving defence-works receives a deeper meaning by being incorporated in the research of conflict archaeology, where 'normal' archaeology tends to treat them only as physical and material archaeological remains without a more advanced contextualisation.

### 3.3 Military Vehicles and Aircraft

*"So, he sent out men and chariotry, abundant, exceedingly numerous like the sand, they being three men to a chariot-span."*

- From the 'Poem', the Battle of Qadesh[15]

A large battle was fought around 1174 BC on the banks of the Orontes river near the town of Qadesh. According to Egyptian sources pharaoh Ramses II was victorious at the battle, while Hittite sources claim the opposite. The battle did however leave Ramses II traumatised by a near-defeat. It also left its mark in history as the first recorded battle in which chariots were used on a large scale. Chariots are animal-drawn vehicles and the first recognized vehicles to be used for offensive warfare. Vehicles have been used in conflict and warfare since the emergence of transport carts and wagons somewhere after the invention of the wheel. These wagons could have been drawn by manpower, but draught-animals may also have been used. The availability of a wheeled, animal-drawn vehicle allows the transportation of large amounts of goods over long distances.

Vehicles here are material means of transportation, other than animals, which are used by human beings and which can be specifically devised for specific purposes. One of these purposes is warfare. The main characteristics of a vehicle on the battlefield is mobility and the combination of mobility with striking-power, making it possible to quickly

[15] Translation after Kenneth Kitchen in *Ramesside Inscriptions* (Kitchen 1996, 5).

engage and outflank enemy lines. The domestication of riding-animals led to the evolution of mounted warriors and chariotry, the use of small floating vessels likewise led to the evolution of war-ships and the invention of the first flying machine led to the development of the air-weapon. By the end of the twentieth century armies have become an integrated machine combining foot-soldiers, motorised vehicles, warships, air-weaponry and long-ranged unmanned weapons into a combined fighting force which can be rapidly mobilised and deployed everywhere on the battlefield, being able to adapt to any situation.

Vehicles themselves are not very often encountered at archaeological excavations and most available data comes from depictions and the documentary record. Underwater archaeology mainly studies shipwrecks and sunken vehicles. Boats may also be encountered during land-based excavations and sometimes parts of vehicles may be encountered. Most vehicle finds can however be dated to the twentieth century and most of these vehicles are related to warfare. The study of military vehicles is still the domain of amateurs and specialised groups, but with the rise of conflict archaeology these vehicles are increasingly becoming an integrated part of archaeological research.

### 3.3.1 Rolling Thunder – The Fighting Vehicle

Throughout history the battlefield has been dominated by the foot-soldiers or infantry up to the present day. The domestication of the horse, somewhere in the 4th millennium BC, made it possible to introduce the first vehicles on the battlefield in the shape of chariotry (Dawson 2001, 122). Documentary sources provide early depictions of wheeled vehicles being used for military purposes in the third millennium BC (Littauer & Crouwel 2002, 26).[16] The first use of chariots in a chariot-battle is known from the 18th dynasty (ca. 1550-1307 BC) in New Kingdom Egypt (ca. 1550-1070 BC), with Qadesh (ca. 1174 BC) being the first battle in which the use of multiple chariots in battle was recorded. The horse and chariot were probably developed among the Indo-Iranian peoples around 2000 BC, being introduced in Egypt around 1700 BCE by the Asiatic Hyksos (Bradford 2001, 13). Chariots typically were small, two-wheeled carts which were drawn by one or multiple horses. There has been a lot of discussion about the exact role of the chariot in warfare. Chariots seem to have been shock-weapons which were used to demoralise the enemy. Experimental archaeology has proved that firing a bow from a moving chariot is possible as is described in chapter 5.3. It is more likely that chariots were used as mobile firing platforms which supported archers and infantry troops (Yadin 1963, 249). By

[16] Further information about the development of the fighting vehicle is discussed in detail in this publication.

quickly attacking enemy pockets of archers chariots were able to protect advancing friendly infantry units (Cotterell 2004, 25). When the enemy lines broke, the chariot may have been used to chase and destroy the fleeing enemy units.

Chariots have been very well represented in the iconographic record but complete chariots have also been recovered archaeologically. The most famous examples are probably the chariots recovered from the tomb of Tutankhamun in the Egyptian Valley of the Kings and the reconstructed chariot from Qantir in Egypt, which has been reconstructed in Hildesheim. A large group of chariots was found at Lchashen in Armenia. They are probably not suitable for warfare, since they are very open and leave its rider exposed to enemy weaponry (Cotterell 2004, 45). A complete chariot-burial, including a span of four horses was discovered near Xi'an in the Shaanxi province of China, dated to the 11$^{th}$ century BC (Cotterell 2004, 187). Another burial dated to the 11$^{th}$ century was found at Anyang, including a span of two horses and the remains of two charioteers (Cotterell 2004, 199). When chariots are discovered in the archaeological record they can prove the presence of chariots on the battlefield near that particular site. The archaeological remains can also provide new insights into the usage and construction of chariots. In arid climate conditions the wooden parts of chariots can remain intact, but when buried the wooden parts will at best only leave soil-marks. Metal parts of chariots are often better preserved.

The rise of new infantry tactics, especially the introduction of skirmishers which swarmed the battlefield, ended the successful reign of the chariotry on the Near Eastern battlefields. Around 1200 BC the so-called Bronze Age catastrophe saw the development of heavy-infantry units which were able to swarm around chariots in order to isolate and eliminate them (Cotterell 2004, 243; Drews 1995, 97). Among these were the Sherden-warriors, captured Sea Peoples in the service of the Egyptian Army. The development of military land-based vehicles came to halt. Leonardo da Vinci (1452-1519) designed several machines of war, including an armoured vehicle, but they were probably never built. The invention of firearms and artillery lead to the development of horse-drawn artillery carts, but land-based fighting vehicles weren't properly developed until the First World War (1914-1918), when the first tanks rolled into the battle of the Somme in August 1916. From now on vehicles combined mobility with striking-power and protection. The rapid technological development of armoured fighting vehicles led to the rise of the battle-tank. The Second World War saw the introduction of integrated mechanised brigades, which combined the mobility, protection and firepower of armoured vehicles with the versatility and operational abilities of standard infantry.

The archaeology of land-based military fighting-vehicles is narrowed down to the motorised vehicles of the twentieth century as well as the pre-twentieth century animal-powered vehicles. Since armoured vehicles have been constructed using metal and alloys, the vehicles and parts of these vehicles have often survived in the archaeological record. Vehicles from the First and Second World War are often encountered during archaeological excavations. Parts of vehicles are often discovered using metal detectors, like pieces of caterpillar-track or armoured plating. During the Second World War many disabled vehicles were left where they stood. Engineer units were later tasked with clearing the vehicles. In the meantime, the local population had the opportunity to loot pieces from the vehicle. Other vehicle parts may have been blown away when the vehicle exploded after being hit by enemy fire. Complete vehicles can also still be discovered. Sometimes abandoned vehicles are still standing on the place where they were left behind.

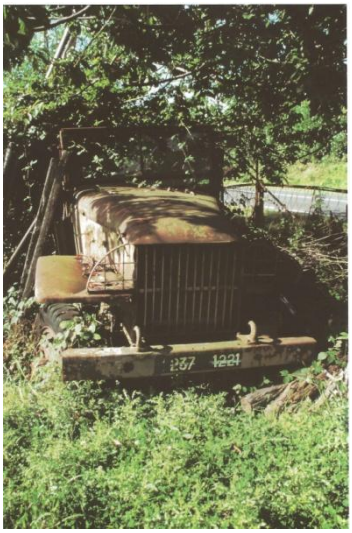

***Figure 19*:** A World War II truck resting in the *bocage* of Normandy, France (Lynch & Cooksey 2007, Plate 18).

The recovery of military vehicles is often left to enthusiastic hobbyists and local historical societies, who often contact professional archaeologists to help them unearthing the vehicle. A good example is a tank from the First World War which was excavated at Flesquieres in 1998. The local inhabitants knew that a tank had been buried somewhere near the village during the battle of Cambrai (Figure 20). The British tank, D51 "Deborah" belonged to the 4th ('D') Battalion Tank Corps. It took a hit on the 20th of November 1917 killing the crew of four. The soldiers were buried nearby and were later re-interred. The British troops later used other tanks to pull the tank into a hole dug by German forces to establish a concrete bunker there. The tank-wreckage could now be used as a shelter against bombardments. The tank was discovered trough the combined

efforts of by Phillip Gorcynski and his associates together with professional archaeologists of the Institut Nationale Recherches Preventives. The British Army contributed by sending men from the 118th Royal Electircal and Mechanical Engineers (REME) Recovery company to help salvaging the tank (Reed 2000; www. tank-cambrai.com).

***Figure 20*:** The Cambrai 'Deborah'-tank wreckage after excavation (http://www.hellfire-corner.demon.co.uk/tank.htm).

Several Metal detecting techniques and very detailed archival research together with the good co-operation between local enthusiasts, professional archaeologists and military engineers make this project unique, but it also sets a standard for future archaeological work concerning military vehicles. In many countries, like the Netherlands, conflict-archaeological research with combined efforts of amateur- and professional archaeologists together with army professionals is still developing. An example hereof is the Studebaker M29 Weasel vehicle that was excavated in 1994 on the beach of Westkapelle. It had gotten stuck in an impact-crater during the landings at Westkapelle in November 1944. Explosives had been placed to demolish the vehicle, but they were never primed. The vehicle took three shrapnel hits. Other interesting features were the serial number, the graffiti mentioning the name 'Linn' which was painted on the vehicle and the kilometre-count of 148 Mills which was still readable. These features make detailed identification of the vehicle possible.

Land-based vehicles may also be found under water. Many ships carrying armoured vehicles like tanks were lost in the English Channel during the landings of Operation Overlord on June 6, 1944. Amphibious vehicles like the Sherman Duplex-Drive (DD) tanks were also lost and sank to the bottom of the Channel. In that same year a German Panther tank fell from a ferry across the Maas river in Roermond, The Netherlands and sank. The tank was removed from the river in 1959 but was destroyed since it used to belong to invading forces during the war. Many tanks and other vehicles are still recovered from bogs, collapsed tank-trenches or firing positions or waterlogged locations like lakes and seashores by enthusiasts and unofficial specialist who actively contribute to the research of these vehicles. It is time for archaeology to take a more active stand in preserving and recovering these vehicles and provide them with an academic context as parts of a field and landscape of conflict.

### 3.3.2 Naval Forces

Almost seventy-five percent of the surface of the world exists of water and the world's system of natural rivers and artificial canals provides excellent routes for trade and transportation. It is thus not strange that many human societies have developed some way of water-transport since the earliest phases of their existence. Human naval history comprises the development from inflatable goat-skins and papyrus bundles crafted into simple rafts up to the large cruise-ships and aircraft-carriers used today. Like most technological advances, the development of seafaring and trade has been simultaneous with the development of military technology. Ships can carry large amounts of cargo as well as fighting men over long distances, turning waterways into ideal trade- and transport-routes. In order to use these routes, they have to be secured, enabling them to be used, as well as protected against pirates and enemy ships seeking to secure the routes to their own advantage. In order to use the seas and waterways and to control the enemy's use of them, armed ships are a necessity. Strong Naval power is needed to protect trade-routes over water, denying the enemy its resources through controlling these trade-routes, protecting the coasts of one's territory, moving and deploying armed troops and the creation of beach-heads as advanced bases for land- and air-operations (Hattendorf 2005, 246).

The study of military ships and vessels belongs to the domain of underwater- or maritime archaeology and thus enjoyed more attention than other military vehicles over the last decades. Underwater-archaeology has developed into a independent archaeological discipline since the 1960's. Just like with other types of military vehicles the pioneering work in this field was undertaken by interested amateurs, often divers who learned to be archaeologists, followed by professional archaeologists who learned how to dive and later by interested 'avocationals' with technical expertise (Flatman 2007, 79; Gibbins & Adams 2001, 286). Once again the co-operation between wreck-divers, professional archaeologists, museum-led ship archaeologists, the military, technical specialists and other interested factions is of great importance here.

In pre-industrial or unorganised societies the ship is often the most complex 'machine' or vehicle which is invented (Muckelroy 1978). The usage of ships goes back to the Neolithic and the earliest shipwreck, found at Uluburun, was dated to the 14$^{th}$ century BC. Maritime technology developed throughout the centuries, making it possible to build huge ships which were primarily used for transport or warfare. The first recorded Sea Battle took place in the Nile Delta of Egypt between the Egyptian Navy and the Sea Peoples, around 1200 BC. Ships played an important role throughout history, but from the seventeenth century AD onward the war-ships of organised navies truly dominated the maritime theatres around the world.

The variety of shipwrecks around the worlds is thus diverse, but their main characteristics are similar around the world making it possible to apply a fixed methodology on them, regardless of their location, date or type of ship (Gibbins & Adams 2001, 279). They all went through some process of wrecking through which they entered the archaeological record. Some of them sank as the result of battle damage when taking a direct hit or after taking sustained damage by multiple attacks, others sank after their cargo exploded by accident or on purpose or the ships were scuttled and sank intentionally to block waterways. Ships may also have sunk after collisions with submerged objects or other ships or they may have run aground. Some maritime vehicles are stranded in shallow water, are buried under the sands of a beach or become artificial reefs in which maritime animals come to live.

At the moment of sinking the ships often took their load with them to the sea-floor. These artefacts were often every-day items, which were not meant to be discarded or deposited (Adams 2001, 299; Gibbins & Adams 2001, 280). Next to personal artefacts the ships also held weapons and cargo. Among this cargo often are ceramics, which can be linked to ceramics used on other vessels, as well as sites on the mainland (Martin 2001, 390).

A lot of weapons, including muskets, pistols, cannons and their associated ammunition and equipment were recovered from the wreckage of the French frigate-at war *Machault*, which was scuttled after taking damage on the 8th of July, 1760 (Bryce 1984, 8). Its cargo provides a wealth of information about the weaponry and equipment used by the French navy and army in the eighteenth century. Together, these artefacts provide an insight in the world behind the wreck itself, into the social life and situation of the crew and the faction to which the ship belonged. The artefacts are often isolated inside the ship and provide a kind of time-capsule effect, although they are still prone to post-depositional processes. Since they are waterlogged environments, the wrecks and associated artefacts are usually structurally and physically altered by post-depositional processes, but well-preserved, especially organic materials (Adams 2001, 293). A good example of this is the good preservation of human hair and brain-tissue from the crew of the *Hunley*, which sank in 1864 during the American Civil war, being lifted to the surface in 2000, some 136 years later and containing over 2000 artefacts (Figure 21) (Neyland 2005).


***Figure 21*:** The *Hunley* lying in a conservation tank at the Warren Lasch Conservation Center and a U.S. Navy button retrieved from the wreckage (after Markidian 2004, 140; Neyland 2005, 71).

Next to the material remains, sunken warships may hold the remains of the dead which were dragged along into the deep, turning the ships into war-graves. The USS Arizona at Pearl Harbour is one of the most striking examples with the ashes of crewmembers who died after the war still being brought to the ship which functions as a grave. Although there are laws against the looting and diving in sunken vessels, especially those which contain human remains, like the 1986 act for the protection of military remains, looting still takes place. Next to illegal diving, many wreckages are destroyed because of fishing with drag-lines near the wreckages (Termote 2010, 15.) Other sites, like the D-Day landing beaches in Normandy are avoided by fishermen due to the large amounts of debris and unexploded ordnance on the seabed (Keith 2004, 29).

Most of the ships have been well documented from the designing and building of the ship, through operation and maintenance to the eventual report of the loss of the vessel (Martin 2001, 384). Just like other aspects of post-1500 warfare it is often assumed that complete documentation is available about these ships. Many reports and documents are however incomplete, destroyed or lost (Termote 2006, 26). Archaeology may provide the true story of a ship's construction as well as its destruction. It may provide information about the life of the crew, unregistered modifications made to the ship and other undocumented data which would otherwise remain unknown. By applying magnetometry, laser-scanning and sonar shipwrecks can be measured and 3D models can be constructed without actually removing the wreckage, working in a non-destructive fashion.

Many coastlines are scattered with military shipwrecks dating to different periods. Detailed studies of sunken ships in war-theatres have been undertaken by maritime archaeologists along the Belgian North-Sea coast (Termote), the Pacific theatre (McKinnon), The Gulf of Mexico (Church & Warren 2008), the English Channel and the D-Day landing beaches. (Neyland & Schmidt 2002**)**. This kind of underwater archaeology is still developing, also under the influence of the increasing interest in conflict archaeology. Both in open seas as in inland waterways like rivers and lakes underwater archaeology is becoming ever more specialised and receives increasing academic attention (Neyland 2005, 61).

### 3.3.3 The Air Weapon and Aviation Archaeology

Air warfare and its possibilities have been debated before mechanised flying was even possible. The first true flying vehicle was the hot air balloon. The concept of balloon flight already existed in many cultures, but the first successful flight was undertaken with a balloon invented in 1782 and tested in 1783 (Crouch 2009, 29). The first recorded military application of hot-air balloons for military purposes was at the battle of Fleurus (1794), where balloons were used as flying observation-posts (Crouch 2009, 55). At the beginning of the 20$^{th}$ century the Zeppelin was invented by Count Ferdinand von Zeppelin in Germany and in 1903 the first motorised aircraft was flown by the Wright Brothers at Kitty Hawk. The airplane was born and its application for warfare was immediately noticed by writers and thinkers, most noticeably by H.G. Wells who foresaw that bombing-aircraft would be used to destroy large urban areas (Wells 2006 [1908]). This was a harbinger to the bombardments on Rotterdam, Eindhoven, London, Dresden, Hamburg, Berlin and countless other cities during the First and Second World Wars. The advent of aerial warfare in fact was a bombing mission using aircraft and it was

undertaken in 1911 by Julio Gavotti and his squadron in Libya (Overy 2005, 262). Next to the armoured vehicle, the First World War further introduced the aerial weapon and the concept of airpower. The aerial weapon rapidly developed. During the Second World War the large-scale aerial combat took place. Airfields were built throughout all theatres of war and air superiority, the control of the airspace, became an important aspect of warfare. Many airplanes were either shot down or crashed due to accidents, with an average of five daily air-crashes a day between 1939-1945 in Great Britain alone (de la Bédoyere 2001, 8).

Air crashes have been recorded in many documentary sources of both official and unofficial nature, like official crash forms, operational record books, squadron diaries, civilian diaries, pilot logbooks, civilian letters, newspapers, notebooks, photographs etcetera. Next to these sources technical blueprints and technical manuals of aircraft and their associated equipment are abundantly available and they can be used to identify parts and other remains of crashed aircraft. Next to these sources there are the old airfields and aircraft factories which are to be studied, but the main focus of aviation archaeology is the aircraft itself. Unfortunately almost every aircraft in the archaeological record has been incorporated therein since it has crashed. In order to properly study crashed aircraft and the associated infrastructure like former airfields Aviation archaeology was introduced. Aviation archaeology investigates the crash-sites, looking for the wreckage itself and the scatter of aircraft parts which were dispersed at impact, the shape and size of the impact crater, the remains of crewmembers and associated artefacts like the equipment, clothing and personal effects of the crewmembers. The remains of airfields and aircraft shelters may also be studied by aviation archaeology.

Aviation archaeology constantly deals with special situations. First of all the human remains of pilots and aircrew need to be assessed properly. Since they are victims of recent conflict they often still have living relatives which have to be notified. This adds an emotional value to the site for the relatives, friends and veterans as well as the local communities and people who witnessed the crash. The presence of the bodies also turns the wreckage into a war-grave which needs special permission to be investigated. The aircraft may also contain live ammunition and ordnance which can explode, while the instruments aboard like cockpit gauges may contain hazardous chemicals which may have leaked into the soil after crashing. Traditional archaeological techniques may be dangerous to apply because of these hazardous situations (de la Bédoyere 2001, 24).

An air crash leaves an entry hole into the ground which may still be visible as a large soil-mark. The impact crater may reach to depths of 5 metres or more below the surface, dependent on the impact speed of the aircraft. The power and angle of impact, as well as the impact material also determines the degree of survival of the aircraft. When the aircraft crashes in a straight angle on top of a rock surface the aircraft will most definitely explode, leaving only a dent in the rock and many scattered pieces of debris. When crashing into soft surfaces like earth or water the aircraft may be better preserved, especially when it crashed at a shallow angle to the ground. Sometimes an aircraft is preserved rather well. There is one known case where an aircraft was landed on the ice, but later sank through it (de la Bédoyere 2001, 32). Holyoak however states that no aircraft has ever been recovered completely intact (Holyoak 2002, 660).

Many aircrafts were made out of unstable metals or perishable materials which have dissolved in the soil, only leaving the reinforced airframe intact, but the frame is often severely compacted due to impact (de la Bédoyere 2001, 24; Holyoak 2002, 658). Engines however, especially radial engines, have the highest chance to survive in-situ (de la Bédoyere 2001, 37; Holyoak 2002, 658). The crash-site will probably be littered with debris, creating a so-called debris-field around the impact zone containing many pieces of fragmented metal. Pieces of equipment worn by the aircrew may also be present. Rubber soles of flyer's boots belonging to the aircrew of a crashed Heinkel HE-111 for example have been found in Austria (Figure 22).[17] Equipment like radio's, ammunition, weaponry, aircrew helmets and other airplane parts may already have been looted from more accessible sites shortly after the crash or later by detectorists. They may also have been removed after the crash as scrap-metal or they may have been buried near the wreck. Some parts still survive in modern monuments remembering a nearby air-crash.

[17] Personal visit to Heimatmuseum am Kastnerturm in Zell am See, August 2011.


***Figure 22*:** A German WW2 aircrew boot recovered from the wreckage of a Heinkel HE 111 in Austria (Museum am Kastnerturm, Zell am See).

Apart from registered crash-sites crashed aircraft may be found at high-risk and low-visibility areas including mountains like the Heinkel mentioned above. The remains of the aircraft have only recently been discovered since the airplane crashed into the ice of a remote glacier and they are being retrieved one at a time. Some aircraft have crashed in lakes or rivers, possibly in an attempt to save the airplane by crash-landing into the water. A B-17 Flying Fortress for example was found in the Fairy Lochs near Gairloch, Scotland (de la Bédoyere 2001, 12). Many aircraft have also been lost over the sea and are now resting on the seabed, often still holding the remains of their crewmembers.

***Figure 23*:** The remains of Argentine pilot Major Carlos Tomba's Pucara that was shot down by a British Sea Harrier during the 1982 conflict in the Falkland Islands (http://www.flickr.com/photos/blinkofaneye/542220608/in/photostream/).

Recovery of crashed aircraft is often carried out by specialised branches of the military due to the explosion-hazard and the status of the wreckage as a war-grave. The aircraft can now be identified by looking for equipment numbers, serial numbers, identification marks, factory codes on equipment, insignia and diagnostic features of the aircraft. The identification numbers may correspond to documentary evidence and official records, making it possible to retrieve a lot of detailed information about the airplane and its crew. Aviation archaeologists try to register themselves with the military so they can contribute to the clearance of a wreckage with their archaeological expertise.

Monuments are then placed to remember the crash and the lives lost in it. The aircrew is often buried at a nearby cemetery or at the nearest military cemetery. Aircraft which are located underwater are often left in-situ, but they are often threatened by decay, the deepening of existing water-routes, fishing activities, the development of wind-farms, strong underwater tides and souvenir hunters. Termote mentions a possible solution to the problem by placing sand-bags and polypropylene netting in and around the underwater sites, preventing them from being damaged (Termote 2010, 16). Wreckages without human remains may be easier to remove since they are often not protected by law (Dromgoole 1996, 34). They can then be studied and placed in museums or become parts of monuments. Identifying the aircraft may give closure to the relatives of the aircrew as well as to the squadron, its veterans and to history in general. Some missing airplanes can finally be given a final identification after their fate has been unknown for decades. Studying the airplanes can further provide information about why they crashed and it can provide information about technical modifications to the plane or special equipment being carried aboard. Its cargo and armament may further be studied as well.

Old airfields and their complete infrastructure are part of aviation archaeology as well and they are often still in use as museums or modern airfields in the present day. Archaeologists and historians may work together to identify older parts and features including buildings, runways and defence-works which have disappeared around the airfields and retrieve associated artefacts. Some airfields receive a monumental status like RAF Coningsby (del la Bédoyere 2001, 51). RAF East Fortune in Scotland is being used as an aviation museum. Other airfields like Biggin Hill in the United Kingdom or the former RAF Laarbruch near Weeze in Germany are now being used as modern aviation airfields. The US Air Force base at Bitburg in Germany was extensively used during the Cold War, but its aprons and shelters are now used for civilian storage. Graffiti and the shelter operating mechanisms still remains intact, just like the interior of many squadron buildings and other structures at the air-base. The squadron emblems and graffiti left by airmen are still present inside the base. This is also true for many other abandoned Cold

War airbases. A detailed survey of the original airfield remains should be undertaken in the future, re-creating the airbases and the life in and around the runways and buildings. Pioneering work on airfields is already done in many European countries, especially in the Netherlands, Germany and Great Britain (Lake 2004, 178).

### 3.3.4 Concluding Remarks:

The use of vehicles for military purposes goes back to the early application of simple carts and wagons, but it evolved into the construction of specialised fighting vehicles. Sporadic traces of vehicles, mainly ships, may be found in the archaeological record between the Bronze Age and Medieval period. Naval forces developed after the Medieval period, leaving archaeological traces around the world. Especially during the last century the application of vehicles has become an integral part of warfare. The durable material of which these vehicles were constructed together with their relatively short-term inclusion in the archaeological record provide them with a good preservation. Vehicles are often accidentally encountered during regular archaeological excavations but they may also be the central objective of archaeological research.

Military vehicles are still largely the domain of amateur archaeologists and specialised enthusiasts. When studying a certain conflict in which vehicles were involved, it is important for the conflict archaeologist however to be able to recognise these vehicles and to place them in their respective context. Aviation and underwater archaeology have incorporated military vehicles into the academic study of archaeology and land-based vehicles are gradually being included as well. Next to scientific data the vehicles also contain the remains of deceased war-victims and therefore excavating them is also a moral obligation which conflict archaeology holds to the memory of the deceased and their remaining relatives.

### 3.4. The Archaeology of Ammunition

"*Where a goat can go, a man can go and where a man can go, he can drag a gun."*

- Colonel William Phillips at Mount Defiance, 1777.

The portable firearm has been the soldier's primary weapon since the eighteenth century, when the pike was no longer used and was replaced by the bayonet. The invention of gunpowder led to the development of explosives and later to the creation of the firearm, a weapon that uses an "explosive charge to propel a missile in the direction of the enemy" (after Bryce 1984, 41). Although its exact origins remain unknown, black powder as it has been used in firearms was invented in China in the seventh or eighth century AD (Chase 2003, 1; Childs 2005, 24). Official military books exist from the Sung-Period (960-1279 AD) indicating the use of black powder made from sulphur and saltpetre (Ling 1947, 161). The oldest gun which is currently known was found in the Chinese village of Pan-la-ch'eng-tzu and was dated to the 13$^{th}$ century AD (Chase 2003, 1). Ibn Nason ben Bia of Grenada mentions the use of firearms by the Moors during the siege of Ronde in 1305 (Lewis 1956, 2).

Whenever an object is thrown through the air in order to hit someone or something in an act of violence it becomes a missile. Whenever a missile is fired from a weapon it becomes a projectile and when fired from a firearm the projectile is called 'bullet.' A firearm is used to launch bullets and on itself is rather useless. Without projectiles it cannot be fired. Ammunition is a collective term for projectiles that are used to load a weapon, especially firearms. Ammunition can either be fired, dropped, ignited or detonated from a specific type of firearm or firing platform before entering the archaeological record. The term 'munitions' is often used to refer to projectiles, firearms and items used for their maintenance (Staski & Johnston 1992, 66). In this chapter the term 'ammunition' will be used according to its most common appearance: the bullets which are to be fired by a firearm and their

### 3.4.1 Basic principles of archaeological ammunition

Where arrowheads are widely studied as archaeological artefacts, firearms-ammunition and other finds dated to 1500 and later are often regarded to be recent disturbances in archaeological surveys and excavations and they are therefore often not recorded.[18] Their location in the topsoil also leads to the rejection of ammunition from an archaeological investigation. Ammunition is however one of the most important artefacts recovered from battlefields on which firearms were deployed, carrying the same importance as arrowheads on battlefields where bowmen were deployed. Many countries do not even recognise the archaeology of 'modern' warfare, from 1500 onwards, as a significant period to be studied by archaeology although it consists of several very distinctive and different periods, for example the Renaissance, the revolutionary era, the Industrial era, the time of the world wars and the period following the world wars. Because it is closer to the present day it is easier to subdivide the 'modern' era into several sub-categories.

Amateur-detectorists, war-enthusiasts and souvenir-hunters however often collect ammunition, mostly treating as a trinket rather than an artefact. Ammunition however does hold a lot of interesting data which is unique to battlefield and conflict-settings and relevant for the study of conflict archaeology. Weapons, shells and grenades often corrode quickly when buried in the soil, but ammunition often survives due to its special treatment and coating (Lynch & Cooksey 2007, 152). Older types of ammunition, like cannon balls from a medieval castle or slingshot-ammunition from a Bronze Age fortress is often regarded as archaeologically relevant and thus studied and recorded. The study of modern ammunition by archaeologists is forthcoming. Musket ammunition used before the mid 19$^{th}$ century is already studied by several specialists like Dan Sivlich, Bo Knarrstrom and others (Roberts et al. 2008; Sivlich 1996, Sivlich 2007 )[19]. The potential to work together with ballistic experts, ammunition collectors and forensic investigators is also present and more investigation about multi-disciplinary research in this field should be explored. First of all some basic terminology and classification should be understood before proceeding.

[18] For study of arrowheads and archery see Webb 1991, Luik, H., 2006, James 2004.
[19] Personal communication with D.M. Sivlich, September 2011.

Firearms are subdivided into two main-categories: small-arms and ordnance. Small-arms are the firearms which are carried with a soldier as a personal weapon. Ordnance is the term used to describe all firearms which are larger than small-arms (Hughes 1969,1). Currently small-arms can be sub-divided into several classes: muskets, rifles, machine-guns, sub-machine-guns and shotguns. All of these classes can be sub-divided into other specific categories (Di Maio 1999, 20). Ammunition is made for both small arms as well as ordnance. Small arms projectiles have been subdivided into four types by Lagarde: penetrating bullets, Setting-up bullets, disintegrating bullets and explosive bullets (Lagarde 1914, 14-15). Penetrating bullets are made to penetrate the human body and keep their original shape, while setting-up bullets are meant to deform on impact and create more damage to the soft tissue and vital organs. Disintegrating bullets also deform, but they disintegrate on impact into many small fragments. Explosive bullets are loaded or coated with a small explosive charge which will combust or explode on impact. Lagarde also subdivided ordnance-projectiles into several categories: shells, case-shot, canister-shot, shrapnel, grenades, bombs, mines and torpedoes (Lagarde 1914, 16-22).

Bullets themselves may be encountered by the archaeologist, both fired and unfired. Bullets evolved from simple lead and iron balls to integrated ammunition fired from cartridges. Ammunition fired from an integrated cartridge leaves not only a projectile behind, but also the cartridge itself. When the bullet was fired, the cartridge was ejected from the weapon. A soldier would often not try to retrieve these empty cartridges during or after combat. Some soldiers, especially those conducting covert operations, will often have taken their empty cartridges from the battlefield, so that their position could not be traced anymore. Many empty cartridges however stayed behind on the battlefield and entered the archaeological record. They are also common finds during excavations in Europe and the Americas. Whenever a projectile itself is not recovered from the archaeological record, the cartridge may still be found. Pieces of ammunition and cartridges like percussion caps or gun flints may also be found in the archaeological record, the latter often initially being mistaken with prehistoric lithic material (Bryce 1984, 29; Horn 2005, 6). When studying the characteristics of ammunition on itself, it can be used to determine the weapon or type of weapon that was used at the particular site or battlefield. In turn, the type of ammunition and type of weapon may reveal the identity of the shooter by determining which faction used the weapon. The weapon may however have been captured and fired by another faction than the faction to which the weapon originally belonged.

### 3.4.2 Reconstructing the battlefield

An artefact on itself is just an object, but when it can be placed in its archaeological context it can provide information which can be related to human activity within a site and its surrounding landscape. This also holds true for ammunition. Ammunition which is archaeologically recovered is often found in disturbed topsoil. It may have been moved over relatively large distances which makes it hard to distinguish artefact assemblages (Allsop & Foard 2007, 140). Natural processes like erosion and agricultural processes, in particular ploughing, are the main factors that affect the distribution of small finds in the topsoil, often up to a depth of 1 meter (Boismier 1991, 11,15). Ploughing processes draw larger objects toward the surface, while smaller ones tend to be moved deeper into the topsoil. After multiple times of ploughing the heavily disturbed topsoil and its stratigraphic structure will not change anymore (Boismier 1991, 18). Artefacts will be mixed throughout the unrecognisable layers of the topsoil, making it hard to assign them to their proper context.

According to Boismier and Baker, surface-finds are not representative for the total artefact distribution of a site and they represent less than 10% of the total population in the topsoil with artefacts greater than 3 centimetres being overrepresented on the surface (Baker 1978, 292; Boismier 1991, 17-18). A model devised by Clark and Schofield indicates that artefacts move horizontally between 20 centimetres and 10 meters after three decades of ploughing (Clark & Schofield 1991, 93). Longer periods of agricultural use can thus move a piece of ammunition far from its original position. This does not render the ammunition and its location useless, Although its direct position has been lost, the ammunition still indicates that it was used in the vicinity of its find-location and it may help narrowing down the size or locating the approximate location of a particular battlefield. It also indicates which weapons were used in the area. If the area is a known battlefield, the ammunition may provide information about the weapons that were used during battle.

Forested areas have often escaped large scale disturbance of the topsoil (Passmore & Harrison 2008, 88). Ammunition which is found here will often be located close to the original place of deposition. Static defence-works ran through many forests during the First and Second World War and ammunition may actually be found in and near these positions in its original location. The type of ammunition may be used to identify the faction that occupied the position, as well as the faction that may have attacked or captured the position. Spent British .303 calibre ammunition which is found near a

German position may indicate an attack on the position, but it may also indicate that the position was occupied and re-used by British troops.

Ammunition which has not been fired was probably dropped at the location where it was found and will thus be relatively intact. Dropped Musket balls will often have an intact sprue and seam. Modern unfired, and thus loaded ammunition will consist of an intact bullet and cartridge. The powder inside the cartridge and the primer will still be intact. The unfired ammunition may even be found inside a container like a metal ammunition box or a leather ammunition pouch. Dropped ammunition can indicate the location where a shooter was standing during a particular moment of battle. The ammunition may have been accidentally dropped during the re-loading of the weapon, which can often happen in the heat of battle. A soldier may also have lost his equipment and ammunition while running or he may have fallen or died with the ammunition spilling from its container. Quantities of intact musket balls found together outside of a direct area of conflict may also indicate the location of a small production site, like a camp where soldiers sat together and made their ammunition (Sivlich 2007, 86).

Fired ammunition can be found in the shape of an impacted projectile or a spent cartridge. The location of spent cartridges may thus indicate the close or exact location from which a weapon was fired. The shooter's position may be pinpointed this way. Impacted ammunition may have either hit its target and exited it again or it may still be present at the location of impact. Places which are scattered with ammunition, both fired and unfired, may indicate individual battle lines, especially when muskets were used. Bullet-holes on objects also indicate that shots were fired at this particular object. They can give information about the direction from which the ammunition was fired, the possible target area and sometimes even the type of target. The place of impact or a man or object standing between that place and the shooter may have been the target of the shooter. The projectile be preserved inside this object. In the 1930's a musket-ball was discovered in a piece of firewood at the former battlefield of the King's Mountain on 7 October 1780 (Mercer 2001).

Ammunition which was fired from a weapon as case-shot or buckshot, thus firing multiple small projectiles from one cartridge or container, will spread out in a certain pattern. It has a horizontal as well as a vertical spread, which may be visible when the shot impacted onto on abject like a tree (Figure 24). Case-shot often is fired in a fan-shaped pattern while the pattern of shotgun buckshot is often trumpet-shaped (Allsop & Foard 2007, 140). By determining the spread of the projectiles and by looking for the

centre-point of a distribution of small projectiles in a triangular shape the original source and direction of fire of the weapon that fired the projectiles can be reconstructed.

***Figure 24*:** Impact-marks of 12 Gauge Calibre lead buckshot on a tree, made in 1988. Photo made in January 2011. The projectiles are still present in the tree and are recognised by a metal-detector.

### 3.4.3 Rough characteristics, Initial field-recognition

A projectile has several physical surface-characteristics which can be determined and measured after deposition in the archaeological if the projectile itself is still intact. These characteristics can usually quickly be determined in the field by the trained archaeologist after a quick visual inspection. First of all a quick visual inspection can give information about the general category to which the ammunition belongs. Outer markings, like a coloured band, may indicate that the ammunition is explosive or loaded with combustible materials, warning the archaeologist not to touch the ammunition. Painted markings indicate the purpose of the projectile (Weerden 2003a, 24). Often the markings have faded while the bullet was being subjected to post-depositional processes.

Whenever a separate projectile or cartridge without a projectile is found, the projectile has most likely been fired already, especially when the projectile itself has been deformed. Checking the primer may provide more information, since the impressions of the firing-pin will be visible when the ammunition was fired when dealing with centre- or rimfire cartridges. Its shape and size can be used to identify the general type of ammunition. Round balls are typical musket-ammunition and were used from the mid-nineteenth century back to the invention of the first firearms. Smaller cartridges are often used for small arms, usually revolvers, pistols and sub-machineguns. Larger calibres ten to have a different shape, of which the bottle-neck shape is most common (Weerden

2003b, 33). Hemispherical, pointed and cylinder- nosed bullets were used from the mid nineteenth century onwards and they were often standardised types of ammunition.

Standardised ammunition was used to fit the calibre of the weapon in which it was used and enhance its performance and accuracy, leading to the standardisation of cartridges. Cartridges can be measured at multiple points. The neck-diameter, shoulder-diameter, head diameter, body diameter and rim diameter can all be measured in order to identify the type of ammunition. The calibre of a weapon is often stamped into the bottom of the ammunition cartridge .Other information may also have been stamped into the cartridge, like a code which can indicate the manufacturer of the ammunition, year and place of manufacture, projectile type and also the material of which the cartridge was made. Some types of ammunition carry unit insignia, like SS-runes for ammunition supplied the German *Waffen-SS* or *Schutzstaffel*. The calibre of a projectile and the imprints on cartridges can often be used to identify the nationality or faction of the shooter, since several factions and nations used particular weapons with specific calibres. Cartridges without markings may dated earlier than the 1880s (Horn 2005, 6).

Musket ammunition is often encountered on many archaeological sites throughout Europe, Asia, Africa and the United States. It has a high archaeological potential to reconstruct individual events on the battlefield. Musket ammunition used up to the nineteenth century had no standard size and usually had an average diameter of 19mm (Iremonger & Hazell 2004, 2). Powder was poured down the smooth-bore musket, followed by the bullet. The bullet was then pressed into place by using wadding, like linen, cotton or paper (Brown et al. 2008, 4). The paper cartridge which held the bullet was often used as wadding in the eighteenth century. The calibre of the musket only set the upper limit of the projectile diameter, making it possible to fire smaller projectiles than the standard calibre with the weapon, although it would be less accurate. A lighter type of ammunition may sometimes have had a higher velocity than a projectile with a larger diameter would have had (Jussila 2005, 20.)The diameter of the projectile itself can be used to estimate the calibre of the weapon which was used to fire it, but with non-standardised ammunition this may thus prove to be problematic.

Musket-balls with a diameter smaller than 0.39 inch or 1 centimetre may have been used in small calibre pistols. They can also have been used as buckshot in a cartridge, together with a larger musket bullet (Sivlich 2007, 88). This combination is called 'buck-an-ball.' It is thus possible that multiple projectiles were fired from a single cartridge or weapon at the same time (Figure 25). Modern shotguns use cartridges packed with buckshot, small lead balls fired from a single cartridge, creating a spread of small projectiles. Since

modern buckshot also has a maximum size of 0.33 inches, it may be hard to distinguish modern buckshot from older buckshot. Musket-balls which were used as buckshot often collided and they were compressed against each other when the weapon was fired, leaving concave depressions in the outside of the projectiles (Allsop & Foard 2007, 131). Concave depressions may also be caused when balls were stored together prior to placing them into cartridges, when they were possibly hammered against each other during transport, which would also cause mould- and sprue-marks to disappear (Sivlich 1996, 103-104). By using a LED-light from several angles the shadows on the ball will make these features visible.[20] This is however not always the case, since not every part of the sprue-mark collided with the sides of the barrel, leaving some parts of the mark intact.[21]

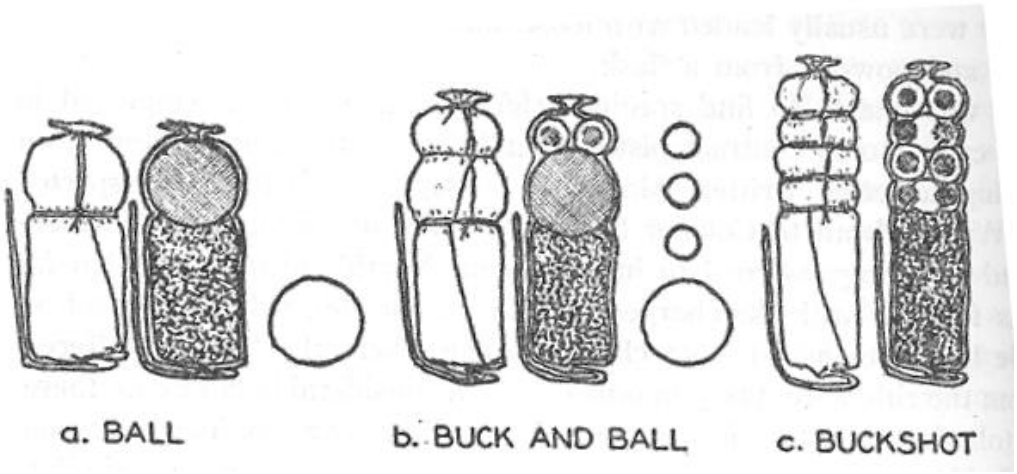


***Figure 25*:** The difference between a musket-ball, buck-and-ball and buckshot cartridges used in smoothbore muskets (Lewis 1956, 110).

Musket-balls were not only fired using muskets, but they were also used in so-called canister-shot or case-shot, in which the balls were packed together in cases or canisters to be fired from a piece of artillery. Musket-balls which are fused together were most-likely used as canister-shot and they may also have taken on a wedge or square shape (Sivlich 2007, 98). When a ball got stuck in the barrel, the operator of the firearm may not have noticed this in the heat of battle and loaded a new bullet. Multiple bullets may then have been fused together.[22] A musket-ball may also have collided with a musket-ball which already impacted its target, creating a cluster-ball (Figure 27) (Sivlich 2007, 90). Shallow circular and round depressions, of which there can be multiple on one ball, may be caused by the ram-rod, which was used to press the ball down into the barrel of a musket (Figure 26) (Di Maio 1999, 65, Sivlich 2007, 88).

[20] Personal communication with D.M. Sivlich, September 2011.
[21] Personal communication with 1st Sgt. T. Verhesen.
[22] Personal communication with weapons-collector., Mr. P. Van Heugten.

***Figure 26*:** The difference between impacted musket balls on hard materials (left) and a ball which probably impacted on a human skull which has an intact casting sprue and possible ram-rod mark (right) (Museum am Kastnerturm, Zell am See; Streekmuseum slag bij Lafelt, Vlijtingen).

When the bullet has penetrated clothing, equipment or human tissue like bone, pieces of these materials may be included into the impacted bullet, especially when dealing with set-up –type ammunition like hollow-point bullets (Di Maio 1999, 63). Tooth impressions may also be visible on musket-balls. Musket-balls may have been chewed during hot weather in order to promote salivation (Sivlich 1996, 105; Sivlich 2007, 92). They could also have been bitten during field surgery, wrapped in leather or cloth in order to reduce pain and prevent soldiers from biting their own tongue and cracking their teeth (Sivlich 1996, 105; Sivlich 2007, 91). It should be noted that these tooth-marks can also have been impressed on the bullet by faunal-turbation. Dogs or pigs may have picked up bullets which they found on the surface or when digging. Some musket balls may have awkward shapes and traces of alteration to be of secondary use as weights or gaming pieces for example.


***Figure 27*:** Musket balls fired as case-shot with collision marks caused by multiple bullets in the barrel colliding (left) and two musket balls which are fused together due to high pressure while firing (right) (Allsop & Foard 2007, 131 & 133).

Advanced methods can be used to further study the ammunition. For the field-archaeologist is important to always treat ammunition carefully and to understand the significance of the ammunition as an archaeological indicator which can be used to reconstruct battle lines, shooting positions, targets on the battlefield and individual events. By studying ammunition individual locations of interest within a landscape of conflict can be located and they can possibly be used to reconstruct the events that happened there. Registration of ammunition finds including its exact GPS location, its depth and stratigraphic location along the possible orientation of firing should be encouraged world-wide. Further study of the ammunition by specialists may be used to effectively reconstruct the conflicts that may have taken place at or in the vicinity of a specific archaeological site.

# Chapter 4: The Speaking Dead

"*Morticians use thread to seal the lips of a corpse. Yet, even with sealed lips the dead can speak."*

- Michael Sledge, author of Soldier Dead

The best indication of violent conflict, or at least armed conflict in the past, is the human skeleton containing weapon trauma. Trauma is caused when sustaining a bodily injury or wound (Roberts & Manchester 1999, 65). Trauma can be studied as a subject of forensic archaeology. Forensic archaeology is concerned with palaeopathology, the study of the evolution and progress of disease in the past (Roberts & Manchester 1999, 1; Renfrew & Bahn 2004, 446). In violent conflicts people die, both military personnel and civilian. Animals can also be regarded as casualties of war. The physical remains of men and animals were often collected and either dumped, buried or burnt. Bodies of fallen soldiers were often quickly buried near battlefields to prevent disease and infection from spreading. From the earliest conflicts until the invention of antibiotics in 1928 infection claimed more deaths than the actual battles in which infections were sustained. Sometimes bodies were left at the battlefield or they were never recovered. Bodies were buried, covered by grass and flora and became part of the archaeological record. Bodies which were left behind and were not buried, as well as cremated remains which were later buried may be included in the archaeological record.

Human remains in the archaeological record become especially interesting and relevant for conflict archaeology when they are found in conflict-related contexts, often displaying trauma inflicted by violence and weaponry. Human remains in the archaeological record are often skeletonised, but they may also have been dissolved by mineral processes in the ground, which may leave a dark stain or an imprint of the body which is visible as a soil-mark. Recent conflicts are also incorporated in the study of conflict archaeology, which may actually lead to encountering relatively recently buried human remains which may still be decomposing. Human remains may also have been altered by burning, cremation, decapitation, deformation or dismemberment due to violent trauma during conflicts and warfare like explosions, weapons trauma, field surgery, building collapse, burial by debris or high impact trauma. Sometimes human remains are preserved by mummification or by special environmental conditions. Proper study of an individual's remains may also indicate that he or she died by homicide or was the victim of war-crimes (Sledge 2005, 12.).

Archaeologists and conflict-archaeologists in particular, will often encounter human remains which contain traces of violently inflicted trauma. Palaeopathology and forensic studies should be used to investigate the trauma that was inflicted to these people and to analyse the way in which the trauma was sustained. Skeletal material can also be used to study demographic mortality when present in good quantities (Armit et al. 2006, 6). It is important that conflict archaeologists are aware of theory and methodology which is applied by forensic anthropologists. A forensic anthropologist specialises in human osteology, recovery of human remains and the identification thereof (Pickering & Bachman 1997).

Victims of conflict may have been killed accidentally or intentionally or they may display trauma sustained by a surgical operation or amputation. Sometimes they have been killed by mass-murder, often as a result of genocide. Some human remains remain in-situ at the place where an individual died. Other remains are taken from the battlefield and buried or even re-buried. Most casualties of conflicts have been identified and have been given proper burials, but many casualties are still missing as they sleep in unidentified graves, unknown and unmarked grave-sites or mass graves which were not meant to be discovered.. Forensic methods make it possible to identify these human remains and to study in them in detail  determine how and when these people died, but also how they lived. Victims of genocide are often buried in unmarked mass graves, which may also be encountered by conflict archaeologists. Basic knowledge of human osteology and physical anthropology, respectively the study of human bones and the study of humans as biological organisms, is needed by a conflict archaeologist in order to properly recognise and identify human remains in the field and to properly treat the remains for study by a specialist.

### 4.1 The Grave

In many fields of archaeology death and burial play a very important role. Conflict archaeology is no exception. Romantic literature has created the vision of the hero, gloriously dying on the field of battle. This ideal however will not have been the desire of soldiers on the battlefield. Being wounded on the battlefield before the invention of antibiotics would often mean death, be it delayed. Instant death would be less painful. The grim reality however was that a soldier lost not only his life, but also the guarantee and honour of a dignified burial (Hope 2003, 88). The rank and file, the lower ranked soldiers, will often have ended up in large, anonymous common graves, while the higher ranking troops and officers would receive individual burials in hierarchic societies ( after Robinson 2006, 5-6). Although many human societies have glorified death on the

battlefield, the prospect of anonymity by ending up in an unmarked grave or a mass or common grave, together with the absence of possible burial rituals or the *ars moriendi*, the art of dying properly, made dying on the battlefield probably less desirable than dying in a civil community to the individual soldier. If the soldier was extremely unfortunate he would not be buried at all, but his remains would be lying on the battlefield and eventually be ravished by the elements, decomposition, animal activity and looting. Whenever the soldier was buried or covered with soil or rubble the body entered the archaeological record. The body carries a wealth of scientific information, but the grave itself is often forgotten. Geotaphonomy plays an important role here. Geotaphonomy is "*...the study of geophysical characteristics of subterranean features associated with the interment of buried evidence and the changes therein* "(Hochrein 2002, 47).

A simple grave is a feature dug into the soil to dispose of human remains and which is later filled in again. A grave will thus typically exist of a grave-pit, grave fill, a possible grave lining or case (like stones or wood along the interior walls of the pit), a possible grave container (coffin, pottery, urn), possible grave goods (also personal items) and the burial (inhumation or cremation) itself. A marker may be placed on top of the grave. Tombs, crypts and sepulchres do not belong to the 'grave' as it is discussed here since are a type of architecture. A grave can be quickly excavated using shovels or mechanical digging equipment in order to quickly salvage the human remains therein, but the traces of the grave itself will be severely damaged. Forensic science occupied with the study of mass graves and the related investigation of war-crimes has introduced new methods and techniques in studying graves. Careful excavation provides insight into the burial practices which were applied and the conditions in which the grave was created. The burial practices and the tools used to dig the grave can be used to help identify the human remains by looking at the specific burial practices of specific factions. They also give insight into how and possibly why the deceased was buried in a certain way. It is possible to study stratification, tool impressions, bioturbation, sedimentation, compression-depression of the soil and internal compaction of the grave. (Hochrein 2002, 47). A possible grave may be visible as a depression in the soil. By carefully removing vegetation the outlines of the depression may be traced. The grave may also appear as a soil-mark with a different colour or texture from the surrounding soil. When the outlines of the grave-pit are established, it is best to dig a central 'window' down to the human remains inside. The grave can then be excavated. According to Hochrein partial excavation, like quadrant-excavation is the best solution (after Hochrein 2002, 64). Hochrein furthers stresses that the loose soil in the grave should be collected with a vacuum cleaner for later sieving and research and that a grave should not be excavated

using military spades or entrenching tools, since these tools may have been used to create the original grave. This would make it impossible to recognise new from old tool-marks. Careful excavation using trowels, vacuum-cleaners and small digging tools can provide detailed information about grave structure and morphology. Vacuuming will not leave indistinguishable tool-marks.

The human remains in cremation graves are often harder to distinguish. They typically consists of ash-pockets containing fragments of human bone. By studying and sorting the bone fragments inside a cremation-grave, the number of individuals may possibly be determined, depending on the state of conservation and size of the bone fragments. The remains may either be dumped into the grave-pit directly, but are more often placed inside a container like an urn or casket. An urn is usually used to contain a single individual which makes it easier to identify the number of individual inside the grave. The contents of the container should however be studied as well to determine the number of individuals inside. More information about the cremated remains may be obtained through artefacts deposited in the grave and by applying forensic methods on the human remains, like the study of human teeth and tooth-pulp cells to determine age or living conditions.

Inhumation graves may be single graves, containing the remains of a single individual, but they may also be a common grave, in which more individuals are interred. The difference between common and mass graves is still debatable. The definition of what a mass grave is often depends on the field of interest of the author. I have chosen to use the fashion in which the bodies are placed in the grave as main criterion to distinguish between mass- and common graves. By studying a variety of definitions considering mass graves it becomes possible to formulate a definition. A mass grave is: "*Any location which is used as a grave, containing primary and possibly secondary interments consisting of the remains of multiple individuals who share a common trait connected with the cause and manner of death and who are often, but not necessarily buried in a disorderly fashion with their remains often being in direct contact with each other*."[23]

The bodies inside a mass-grave are often disorganised by randomly throwing them into the grave. No burial ritual is applied and there is often no regard of respect or dignity and in the words of Skinner: "*No reverence to the individual*" (Skinner 1987, 268). A common grave can be regarded as a type of mass grave, because it also holds the remains of multiple individuals, but they are buried in an orderly fashion with the remains often not being in direct contact with each other. These types of graves were created on

[23] Definition by the author.

battlefields where soldiers are buried after battle, so I will refer to them as military common graves. The bodies are placed in the grave, often according to certain rituals and traditions and with dignity, instead of being simply thrown into the grave.

A good example of a military common grave is a grave containing 2000-3000 corpses from Napoleon Bonaparte's army, discovered in 2001 in Vilnius. Napoleon's troops arrived in Vilnius in December 1812 on their retreat from Moscow. The remains had skeletonised, but many artefacts and personal items have been discovered in the graves which indicates that the soldiers were buried with their uniforms still on, probably frozen to their bodies. Gaiters, shoes, buttons, buckles, a shako and other pieces of equipment were present in the grave. Most of the burials were male, but three female remains, probably belonging to army followers were also found next to the remains o three horses and a mule. The bodies were most likely frozen, which 'froze' them in the position in which the individuals had died. The bodies had been placed into a large V-shaped trench, probably a *redout* used for French artillery batteries. It is known that six of these batteries were dug in Vilnius in July 1812 (after Signoli et al. 2004). The bodies had all been placed in the grave instead of being thrown in. At the battlefield of Towton the bodies of the fallen had also been buried in common graves (Figure 28) (Sutherland 2010, 40-41). Just like in the Napoleonic common grave the bodies had been tightly packed together, but they were neatly placed into the grave-pits and stacked on top of each other. in a 'sardine-can' style. A neatly organised common grave was also discovered at the battlefield of Visby, next to several disorganised mass-graves (Thordeman et al. 1939, 60-64.)

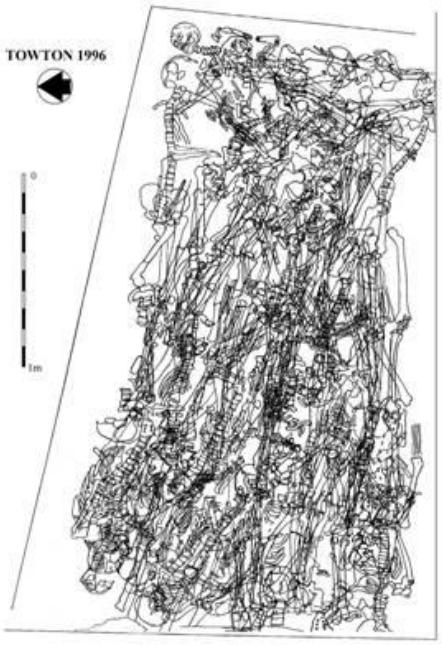


***Figure 28*:** Drawing of the Towton mass-grave (Sutherland & Holst 2005, 38).

Several other types of mass graves can be distinguished. Plague pits for example are mortuary pits which are used to dispose of the victims of epidemic diseases like the bubonic plague. They are often large pits in which bodies were placed in the Christian west-east orientation with the legs flexed so the bodies would fit in the trench or pit like the bodies found in East Smithfield, London (Sutherland 2010, 41; Hawkins 1990). Mass grave are however often associated with large-scale killings, like genocide. Genocide is '*... the mass murder of as many people as possible on the basis of born national, ethnic, racial or religious identity as such; with intent to eliminate the targeted group entirely and internationally*" (Katz 2009). Genocidal or execution mass graves are known from past as well as recent conflicts and is often related to ethnic cleansing. These graves often contain people belonging to the same ethnic group, who often dug their own grave being forced to do so by their murderers. They were later killed and dumped into the grave, often with their personal belongings still on their bodies. Their identity was destroyed and hidden both in life and in death (Jessee, E., Skinner, M., 2005).

Jessee and Skinner distinguish a further typology of genocide-related mass-graves. They distinguish surface- and grave- execution sites based on the place where the victims were killed. When the victims were executed on the surface, their bodies would remain there, leaving behind traces of blood, bone, clothing and personal possessions. This would create a temporary surface deposition-site at the execution site. When the bodies were left there, the site would become a permanent surface deposition site which is distinguishable

by a larger number of human remains and artefacts on the surface. When the bodies were buried or the victims were killed at the edge of the grave the site should be called a grave-execution site. This can either be a primary inhumation site or a secondary inhumation site, the latter recognisable by the comingled human remains and multiple stratigraphic series of body masses (Jessee & Skinner 2005, 57-58).

In order to identify the execution-site it is important to study the area around the mass graves, especially when the victims were killed by gunfire. Ammunition and ammunition-casings may still be discovered, providing information about the weapons which were used to kill the victims. This data can be used to possibly identify the killers (Schmitt 2002, 284; Simmons 2002, 272). Each individual mass grave is unique, since the composition of bodies inside the grave and the grave- morphology and environment are never standardised. The bodies inside the grave decompose at different rates and the putrid liquids from the bodies make them stick together, creating clusters of body masses in the soil (Haglund 2002, 247-248). When secondary burials are added to an existing mass grave, creating a secondary inhumation site according to the typology by Jessee and Skinner, these will create a new stratum. Other bodies are in contact with soil matrices and display traces of interaction with the minerals and acids in the soil.

Especially important in recent mass-graves is that soft-tissue like skin and flesh, as well as teeth, clothing, hair, finger- and toenails may remain intact. Tattoos on the skin may also still be visible. These features, together with the presence of personal effects, create a large scope of methods to identify the victims. Next to visual identification based on biological characteristics and the socio-cultural affiliations of the victims forensic methods can also be applied, like DNA identification, tooth-pulp investigation and other forensic identification methods for individual body-parts. The human and material remains rapidly deteriorate in the soil due to post-depositional processes, making it vital to find and identify the graves and their victims as soon as possible.

### 4.2 Trauma

Violent conflicts are accompanied by weapons and weapons are primarily used to wound or kill opponents rendering them unable to resist or oppose. This goal is achieved by inflicting deliberate trauma to the opposing party. Trauma here refers to a bodily injury or wound, which is the results of accidents or violence, the latter often being inflicted deliberately (Renfrew & Bahn 2004, 450). There are several types of trauma and each time is based on the way in which the trauma is inflicted or which type of weapon was used. Generally three main types of weapons trauma can be recognised: blunt-force trauma, sharp-force trauma and projectile trauma ( after Boylston 2002, 359; Loe 2009, 269). Other types of weapon-related trauma are also described below (also see Figure 29):

Blunt-force trauma refers to trauma inflicted by using a blunt weapon, like a mace, club, stick or rock.

Sharp-force trauma refers to trauma inflicted by sharp objects, like bladed weapons or objects with sharpened spike like pikes, spears or pointed sticks.

Ballistic/projectile trauma and wound-ballistics refer to trauma inflicted by fired projectiles, can also be seen as a special form of penetrating trauma.

Penetrating and Perforating trauma also refers to the use of sharp weapons, but also to the penetration of the human tissue by projectiles and shrapnel. When the penetrating trauma has both entrance- and exit-wounds it is referred to as perforating trauma.

Blast trauma is caused primarily by the overpressure of explosion and often secondarily occurs in combination with penetrating trauma caused by the explosive's shrapnel and external debris. Tertiary blunt-trauma can be caused by the blast-wave which may launch the victim and throw it against objects.

Burn trauma is caused by the use of fire as weapon or by fire which is created as the result of using a certain weapon. Incendiary ammunition, flaming arrows, flamethrowers And napalm are possible examples.

Traumatic amputation is also a form of trauma, in which a wounded body-part or limb is removed, creating an amputation wound.

Altered Tissues are also discussed in this chapter, although they most often are the result of other types of trauma. They can be caused as effects of infections caused by weapon trauma to the human body.

More information on conflict-related trauma, its recognition and the traces it leaves on the human body are discussed in appendix B. The aforementioned types of trauma leave four categories of traces on the human body: fractures, displacement or dislocation of the bone, disruption of the blood and nervous system or artificially inflicted abnormal shapes or contours (Roberts & Manchester 1999, 65). Damage inflicted directly or indirectly to the bones is best visible with human remains in the archaeological record. Partial or complete breakage of the bone is referred to as a fracture. Fractures may be caused by direct and acute injuries, like trauma inflicted by a weapon. The head-injuries of Neanderthals discussed in chapter 1 are to be regarded as cranial fractures. When the soft tissue of the human body is penetrated, be it by a blade or a projectile, the source of penetration may come into contact with the underlying bone, leaving a fracture behind. The fractures left by penetrating trauma are often incomplete fractures; they do not completely break the bone (Rose et al. 1988, 106).

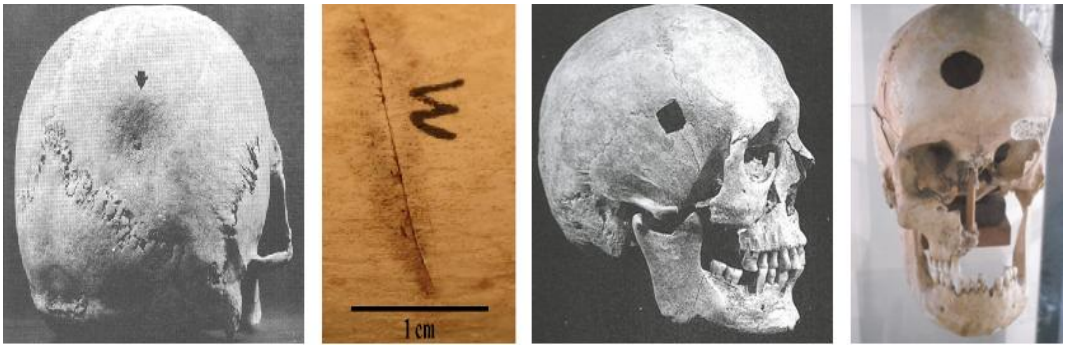


***Figure 29*:** Archaeologically retrieved *crania* displaying several types of trauma. From left to right: Blunt-force, sharp-force, penetration (war hammer spike at Towton) and ballistic (musket ball at Lafelt) trauma (Left to right: Roberts & Manchester 1999, 81; Lewis 2008, 2004; Novak 2010, 99; Streekmuseum Slag bij Lafelt, Vlijtingen).

Fractures may also be caused by certain diseases or repeated stress of the afflicted bone (Roberts & Manchester 1999, 68). They may have been sustained during conflict and they may indicate the cause of death, but they may also have been sustained long before death or they may have been inflicted *post-mortem*. Trauma sustained in conflict and in battle is often aimed at the head or torso, but may also have afflicted other parts of the body. The vital organs in head and torso however represent the prime targets of the human body since a direct hit with a weapon can instantly kill the opponent. Wounding patterns are often best visible on the cranium (Boylston 2002, 359). The identification and study of combat-related trauma on archaeological, conflict-related human remains has been the study of several archaeological projects, like those at Towton, Visby, Kamakura, Vadum Iacob Castle and Little Bighorn among others. The most common types of injuries throughout time are blunt- and sharp-force trauma. In conflicts from the 18$^{th}$ century onward projectile wounds become more common.

### 4.3. Identification of Casualties

By identifying human remains they become individuals. Identity is important to the individual, especially when a violent death may be imminent. Soldiers have therefore often marked their possessions, but also their own bodies in order to be recognised when they died. Soldiers may have made their own identity tags. When these tags are made out of bone, wood or metals they may have been preserved in the archaeological record. Individual identification tags or pins were made during the American Civil War (Sledge 2005, 97.). General George Meade (1815-1872) ordered his men to write their names on pieces of paper and pin them on their blouses before the battle of Mine's Run during the American Civil War. (Sledge 2005, 97; Woolley 1988). Chaplain Charles C. Pierce (1839-1914) was the first one to issue identification tags to US armed personnel in 1899 with the first standard issue of identification tags on aluminium taking place in 1913 (Woolley 1988). The M1940 tag, later known as the dog-tag was issued in 1940. The British troops carried strips of tape in their tunic pockets during the Boer Wars and were issued tin identification tags in 1906. German soldiers adopted the *Erkennungsmarke* identification tags when their *Wehrmacht* mobilised in 1939.

From the Second World war onwards soldiers have been issued with standardised identification tags, making it easier to identify their remains. One tag was usually left on the body while the other one was removed and attached to a grave marker. (Sledge 2005, 105). This does not mean that every fallen soldier is carrying an identification tag. The soldier may have lost his tags or they may have been destroyed by enemy fire or explosions. Sometimes a tag may have been pressed into the body by shrapnel or debris with the tag getting embedded in the bones. Even when tags are found they may not be legible due to corrosion by gas, bodily fluids, exposure to the elements and post-depositional processes. The tags may also not directly identify the one who is wearing them. Soldiers may have carried the tags of a fallen comrade. Tags recovered from plane crashes, destroyed buildings or other cases of multiple fatalities in which the body is destroyed may be scattered and cannot be assigned to specific human remains. Furthermore, finding an identification tag does not mean that the owner is deceased. Klaas Bot found a US 'dog-tag' in Lambertsbergh when returning from his holidays in July 2003. The tag belonged to Luther Allin from Chattanooga, Tennessee. Bot contacted the son of Mr. Allen, who himself had died on October 19 2002. (Bot 2004, 7).

When no identification tags are found, pieces of equipment may be used to identify the faction to which the soldier belonged. Many pieces of equipment are faction-specific in shape and colour and they may bear faction-specific insignia, medals or markers. Buttons

and belt-buckles may be marked with the faction or regiment of the owner (Lafelt/Napoleonic Grave/ US Button). Weapons, ammunition and virtually any piece of equipment can be used to identify the individual as being a soldier belonging to a certain faction. Trauma and the burial of the individual with others of a certain faction may also be used to identify the faction to which the individual belonged.

Equipment itself may be marked with the name of its owner or a serial number, but it should once again be noted that marked equipment may have been worn by another individual than the owner. Other information about the owner may be found on the equipment, like clothing size indicating the length of the owner, while shoes or boots may provide a shoe size. Personal effects may have been provided with the name of their owner, like rings, engraved pens, bracelets, books, necklaces, pendants, photographs etcetera. A golden pocket-watch was found with the possible remains of Lieutenant Crittenden who died at the Battle of Little Bighorn in 1876. His father later described the watch in a letter. Personal items tend to 'absorb' the personality of the owner and therefore have a special value. Engravings on personal items may also give an insight into the individual's identity. Wedding rings often contain the name of the individual's spouse.

### 4.4 Recovery of Military Casualties

Human remains from the past are often treated with the same respect as normal archaeological materials or artefacts, mainly because a barrier of time stand between the archaeologist or the observer and the deceased individual. His or her name and physical appearance is mostly unknown. It is a name or depiction that identifies the remains as a recognisable individual. Human remains are often connected to the living through political, religious, economic, social and ancestral relationships (Parker Pearson 1999, 171). These direct connections with the dead let the continuity of the past permeate into the present.

Human remains carry emotional significance, especially when dealing with the remains of fallen soldiers. Many soldiers are still buried in unknown or unmarked graves in foreign countries or they have been captured by enemy forces and are listed as 'Missing in Action' (MIA). They may have died and were buried, but their gravesite remains unknown. The recovery, identification, marked burial and possible repatriation of these military casualties has a practical as well as an emotional and moral significance. The recovery of the dead by a country is a showcase of dignity toward the people who fought and died for this country, their beliefs and their comrades. The bond being shaped by comrades during conflicts is partially reinforced by what George Mosse calls the 'cult of

the fallen'; the dead living on in their surviving brothers in arms (Mosse 1979, 7.). Many modern soldiers still fight in the remembrance of their fallen comrades.[24] Repatriation services also political goals (Sledge 2005, 26). They show the goodwill of former enemies towards a certain nation and they can strengthen ties between countries and organisations. After its defeat in the First World War, Germany made a national policy out of the glorious repatriation of the fallen in order to cover up their defeat (Goebel 2004, 501).

Repatriation of the remains of soldiers has a special importance. A soldier, serving the honour of his country, is seen as a part of that country. This nationalistic sentiment is perfectly illustrated in the World War I poem 'The Soldier' by Rupert Brooke in which the soldiers is not only represented as fighting for his country, but by actually being part of the country itself in the lines "*...that there's some corner of a foreign field that is forever England. There shall be in that rich earth a richer dust concealed; a dust whom England bore, shaped, made aware....*" (Brooke 2007, 83).

The desire to die among friends and family and to be buried at home is strong in Western culture, but it is likely to be a universal trait. In the Ancient Egyptian story of Sinuhe, the Egyptian Sinuhe says: "*What matter is greater than that my corpse should be buried in the land wherein I was born?."*(after Lichtheim 2006, 228). The *ars moriendi*, the art and correct way of dying played an important role during the American Civil War. The family, performing certain burial rituals had an important place in the tradition for 'good dying' (Faust 2001, 12) Because of the absence of their loved ones, many soldiers took photographs or other pictures of their families with them as reminders of home, but also as replacements of the physical loved ones to which they could talk when dying (Faust 2001, 14). These photographs may survive after being buried with the body.

Seeing and recognising a body brings finality to the bereaved who stay behind (Sledge 2005, 23). The identification of a soldier's remains brings closure to the family and loved ones. Valerie Hope states that the bereaved of fallen Roman soldiers which were not brought home physically or emotionally could not reconnect with the loved ones they had lost (Hope 2003, 84). Up to the nineteenth century officers were often properly buried at cemeteries near the place where they had fallen, but normal soldiers were often buried in anonymous mass graves, which were unmarked or which were only marked with the name of the regiment to which the soldiers belonged (Hope 2003, 80). Families had to learn from friends and comrades of a fallen soldier that their loved one had died in the

[24] Personal communication with several Dutch Army veterans who served in Afghanistan, Iraq and Lebanon.

field. Sometimes their hope remained unrewarded. Military cemeteries still hold monuments like 'walls of the missing', bearing the names of soldiers whose remains were never recovered. Whenever the remains are recovered at a later time, a marker will be placed near the appropriate name on this monument of the missing, a visual representation of the closure of uncertainty for family and friends. When bodies are found, they may have been severely damaged by acts of conflict. The bodies of many soldiers are destroyed by explosions, like the bodies that lay in no-man's land in the First World War, which were torn apart by constant artillery fire (Sledge 2005, 15). These bodies are often unidentifiable.

The American civil war saw the first proper registration of fallen soldiers. During the First World War the United States Government created the Graves Registration Service on August 7, 1917 in order to identify the remains of fallen soldiers, keep records of burials, establish military cemeteries overseas and coordinate mortuary affairs with the bereaved and with foreign governments (Sledge 2005, 36). The GRS is currently known as the DPMO (Defense Prisoner of War/Missing Personnel Office) and is supported by CILHI (Central Identification Laboratory in Hawaii). Other organisations dedicated to the recovery of military casualties are the German VBGO (*Verein zur Bergung Gefallener in Osteuropa*), the British Commonwealth War Graves Commission and the Dutch *Gravendienst* or *Dienst Berging en Identificatie*, part of the Dutch Army 240 Dienstencompagnie.

Military casualties can be recovered during combat or shortly after combat in a certain area has ceased. The bodies of the fallen may also be recovered after a longer period of time and after hostilities have effectively ceased. Michael Sledge uses the term 'Historical Recovery' in his book 'Soldier Dead', based on the term used by the US army (Sledge 2005, 82). In historical recoveries the retrieval of human remains enters the domain of archaeology. Archaeologists, physical- and forensic anthropologists often work side by side with personnel of the US armed forces during these operations which are aimed at the active searching for the fallen soldiers. The German VBGO is an organisation of volunteers and is funded by donations which is very active in Germany and eastern Europe to recover the dead form the First and Second World Wars, working together with official organisations like the *Volksbund Deutsche Kriegsgräberfürsorge*, the *Deutsches Rotes Kreuz Suchdienst* and the *Deutsche Dienstelle* (WAST). Archaeologists are free to participate in the organisation and contribute by introducing archaeological expertise and methodology. In other countries like the Netherlands and Belgium there is no organisation which is responsible for the active search for human remains dating to the Second World War. The appropriate authorities like the *Dienst Berging en Identificatie* in

the Netherlands or the *Instituut voor Veteranen* and the *Nationaal Instituut voor Oorlogsinvaliden, Oud-strijders en Oorlogsslachtoffers* in Belgium are only alerted when bodies are found by private individuals or during commercial construction and archaeological projects. Some archaeologists like the Dutch Laurens Flokstra are concerned with the creation of similar organisations as the DPMO and VBGO in countries without specialised organisations for the active archaeological recovery of the casualties of war (Deurloo 2009).[25]

Whenever good records are kept of the places of burial, either by individuals or official organisations, it should be possible to discover the actual location where the human remains have been buried. Sometimes a body cannot be recovered because the burial site has been overbuilt. The body may also be located on an inaccessible location, deep in the sea for example. It may also be possible that a body cannot be recovered on legal grounds. The 1986 Military Remains Act was mainly designed to safeguard human remains in crashed and sunken vehicles and to protect people against unexploded ordnance (Holyoak 2002, 657). The act includes any cargo, munitions, apparel or personal effects and any associated human remains (Dromgoole 1996, 33-34). The case of a vessel and aircraft which may have been on board are also protected by the Act.[26] The wreckages become war graves and they are not allowed to be disturbed without special permission (Roach 1996, 352). It may thus be a problem to recover the body of a sailor or airman who is to be buried in a grave situated on the mainland. The *USS Arizona* was attacked during the attack on Pearl Harbour on the 7th of December 1941, becoming a submerged tomb. The Number 4 gun turret has been placed over the site, so that surviving crewmembers of the ship may place their cremated remains in it should they wish to be with their brothers in arms in death (Sledge 2005, 213).

Sometimes graves and human remains do not survive into the present day. A grave-marker or monument remembering the dead may however still be present, making it possible to remember the casualties of war even when their bodies are destroyed or moved elsewhere. Grave-monuments may be used to locate graves which have not been recorded in the documentary record. When the grave has been destroyed, the monument may indicate the number of dead, their names, rank or title and provide even more detailed information. Many monumental tombs are found in the Near East and the Classical World in which no body or grave inventory is present anymore. The depictions and texts on these monuments however make it possible to identify the individual for whom the burial-monument was built. The texts in Egyptian tombs for example reveal a

[25] Personal communication with L. Flokstra.
[26] Protection of Military Remains Act 1986.

lot of information about the occupants of the tomb, but it should be noted that most of the depictions in the tomb refer to the afterlife. Graves, especially common graves may be covered by some kind of monumental superstructure which remembers the dead like a *tumulus* or a cairn. Simple gravestones may also be used, but they usually indicate the presence of individual single-graves. They may mention the name and rank and sometimes the regiment or army in which the deceased has served. Grave-markers may be only simple stones which have not been inscribed with information, only indicating the presence of a grave. Another type of monument associated with the deceased is the war memorial. A war memorial is built at a central location. This location may be the actual battlefield or a site where the deceased individuals were killed, but it can also be a communal building or it may be located in the hometown of a regiment or the hometown of the deceased. The bereavement of soldiers who have been buried far from home or whose remains have never been recovered can take place at these monuments (Goebel 2004, 487). They may serve as a symbolic grave for the casualties of war.

In different fields or archaeology the grave monument is studied, since the associated human remains have already been destroyed. This can be a The study of trauma and human remains within the context of conflict-archaeology illustrates the way in which people died during the conflict. All kinds of information can be drawn from these individuals, like their diet or their habits of chewing tobacco (Glenner et al. 1994). By applying forensic methodology the weapons which were used to kill the individuals can be reconstructed, as well as the angle in which they were attacked. Injuries may also indicate the direction of attack and with which hand the attacker wielded his weapon. Information about living conditions, surgical procedures, weapon types and weapon handling, infections and disease and the strain upon the human body due to military life can all be extracted from the traces of trauma found on victims of conflict. In order to properly study weapons trauma the application of osteology, forensic and ballistic studies is needed. Conflict archaeology again stresses the importance of interdisciplinary research here, contributing to all involved fields of research simultaneously. Apart from the many laws, ethical codes and moral values connected to the archaeological recovery and study of human remains, dealing with human remains also has a public and an ethical function in a conflict-related context: the identification and possible repatriation of the casualties of war and the identification of the ‘nameless dead.’ Conflict archaeology also shows that the laws regarding human military remains should be revised. The protection of military human remains should go further than the casualties of ‘modern’ conflicts. Whenever the bereaved desire their loved one to be recovered this should also become legally possible, creating an opportunity for conflict archaeologists to study the remains

of the casualties of war, allowing their story to be told. The quote at the beginning of this chapter indicates that the dead can still speak to us, we only need to allow them to do so.

# Chapter 5: Keeping up with time

*Improvise, Adapt, Overcome*
*- US Marine Corps Saying*

Improvise, adapt and overcome. As a rapidly developing discipline within the field of archaeology that is just what conflict archaeologists have to do. They study categories of newly introduced artefacts, change their views on existing artefact types, deal with theoretical and practical problems and they quickly have to adapt to the new scientific possibilities in related academic studies, just like any other kind of archaeologist pioneering in his or her respective field. The previous chapters dealt with the influence of conflict archaeology on the study of documentary and material sources by examining emerging fields of study and existing critique and problematic issues. This last chapter will focus on some loose ends. Some practical aspects of Conflict Archaeology and its applied methodology have rapidly developed over the past decade. This rapid development is still ongoing and Conflict Archaeology is literally on the frontline of technological and methodological development in the field of archaeology. Because of its broad field of interests and specialisations conflict archaeology rapidly absorbs new methods, also from other scientific disciplines while also contributing to these particular fields of research. Applying a methodology of research to the field and landscape of conflict also carries its own problems and raises new questions to be answered. Conflict Archaeology is, just like the conflicts it studies, a dynamic field of research in which interdisciplinary research, rapid specialisation, heritage issues and public archaeology play an important role. It does not only explore past conflicts, but the integration of modern research methods and current issues in the general archaeological paradigm as well. Traditional archaeological field methods can be applied only selectively, since the archaeological find-scatter on a battlefield differs from other types of archaeological site like settlements (after Pollard & Ferguson 2008, 9). The existing methods are supplemented with new methods, often experimental ones, in order to achieve the maximum amount of usable archaeological data.

### 5.1 Making the most of Methodology

Before actual research takes place there has to be an event which triggers the research and focuses archaeological interest on the former landscape of conflict. This may be an existing archaeological project in which conflict-related artefacts, structures or a conflict-related context are discovered, a development plan for the area in which a historical battlefield is or is expected to be located or the plan of a local interest group to deliberately locate and investigate a certain battle for example. The location of many fields of conflict is known from maps, written accounts and other documentary sources and it is therefore possible to apply conflict archaeology to a known battlefield. Sometimes a battlefield is poorly documented and only its approximate location is known. In this case conflict archaeology can be used to locate the archaeological parameters and features which indicate the presence of a conflict. It is also possible that a battlefield is completely unknown and it traces are encountered during an existing archaeological project. Archaeology then is the only indicator for the particular past conflict. . Conflict archaeology thus studies conflict-related elements from archaeological projects, but it can also be applied to specifically locate and investigate a historic battlefield.

By looking at some existing battlefield projects and their methodology as well as exploring experimental methods and their application this chapter will illustrate how theoretical knowledge about conflict archaeology and the investigation of a landscape of conflict can be taken into practice. When studying a complete landscape of conflict the research, just like any other archaeological project, begins with desk-based research. Chapter 2 has illustrated several kinds of historical sources which may be used as reference-material and the associated problems. By using all available sources a historical framework can be set up, placing the site in its proper historic context. Using this historical material specific areas of interest including battle lines, roadways to and from the battlefield, specific spatial features, landmarks, grave-sites etcetera can be referenced with modern maps and highlighted for archaeological research. The main research strategy can also be established.

A battle only was a short-term event often lasting a couple of hours, but it left a considerable amount of archaeological material. By creating an itinerary of the battle using historical sources and creating maps indicating several stages of the battle further areas of interest may be recognised, like the place where skirmishes took place and where artefacts were dropped or the locations of battle-lines where ammunition may have impacted. By looking at several existing projects at Prestonpans (Pollard 2010,

Pollard & Ferguson 2008), Culloden (Pollard 2009; Pollard & Banks 2006), Fontenoy (Personal communication with A. Tripnaux), Pointe du Hoc (Wattenburg Komas & Burt 2009), Towton (Fiorato et al. 2010), Ploegsteert (Masters & Stichelbaut 2009), Somme front (Stichelbaut 2005; Stichelbaut 2006; Stichelbaut 2011), Little Bighorn (Scott et al. 2002) among others and by comparing their methodologies an overview will be given of possible methodology, its current development and the related implications and expectations.

When the historical framework has been set-up individual areas of interest within the landscape of conflict can be designated. This can be done partially during the desk-based research by studying maps. Important positions and locations on the battlefield can be highlighted. Trenches, artillery positions and battle lines are potential areas of interest. By relating and comparing the historical maps to actual topographic maps the approximate location of these areas can be located. The next step of data collection is the survey. Surveying can be undertaken in many ways. The easiest way to investigate the battlefield is by pedestrian survey and field reconnaissance. Important features on the battlefields like elevations, visible structures, existing buildings, roadways, monuments etcetera can be cross-referenced with available maps and documentary data. By using a GPS or a Theodolite/Total Station these features can be mapped and imported into a GIS-system, making it possible to create digital maps of existing battlefield which can later be supplemented with archaeological data as the project progresses.

A pedestrian survey or surface survey is seen as the most basic yet most widely applied method of surveying (Banning 2002, 40). Geophysical survey, which is mainly non-destructive, may provide interesting results. A lot of artefacts may be located within the tops-soil at a former battlefield. Metal-detector surveys are very useful here since a lot of military equipment and ammunition contains at least some traces of metal. Pollard and Sutherland both describe metal detector surveys as the most appropriate method of geophysical survey on a battlefield (after Pollard & Ferguson 2008, 9; Sutherland & Holst 2005, 21). Enthusiasts and local metal detectorists can be educated and contacted to help, report their findings and contribute to the project rather than have them scouring and looting the battlefield on their own. This approach has proven to be successful at many projects, including those mentioned at Culloden, Little Bighorn, Prestonpans and Towton. At Towton for example hundreds of artefacts were found in the topsoil and 88 at a selected part of Marston Moor, including prehistoric artefacts (Sutherland 2004, 15; Sutherland 2009, 115). Metal detector surveys are fairly cheap, they can be used to cover a lot of ground and they provide good results. They also invite the public to participate,

are fairly non-destructive and can be used for artefact-patterning studies and can be easily included into a GIS map.

Other non-destructive geophysical surveys may include resistivity survey, magnetometry, electromagnetic survey, acoustic survey, Ground-Penetrating Radar, Chemical survey or satellite survey, based on the type of archaeological data which is needed and the landscape geology, features and morphology (after Banning 2002, 44-45; Cheetham 2008, 564). Remotely sensed imagery from aerial platforms is also a method which is becoming increasing popular in the field of conflict archaeology. Since the First World War aerial reconnaissance and aerial photography have played an important role. According to Cheetham aerial photography is the most productive archaeological prospection technique (Cheetham 2008, 574). It captures the landscape as it is, including its built features, soil marks, crop marks, crest shading and colourations which can all be referenced to a spatial location by using a map and GPS. With satellite imagery becoming ever more available through freeware programmes like Google Maps and Google Earth the world of aerial prospection is gradually being moved to the archaeologist's home desk.

Aerial photographs have been widely made during the First World War and they have been studied by archaeologists like Stichelbaut, who applied the aerial photographs to several sites like the Somme Front and Ploegsteert (Masters & Stichelbaut 2010, Stichelbaut 2005, Stichelbaut 2006, Stichelbaut 2011). Stichelbaut mainly used the photographs to study the development of aerial photography and to describe and physically investigate the visible traces in these photographs, which may be traditional archaeological sites or structures and battle-damage related to the First World War (Stichelbaut 2005, 235, 239). Archives of aerial photographs from conflict-zones in the twentieth century may provide a lot of interesting information. It should be noted that some features are invisible from the sky, since they may have been camouflaged. German HOUSE-painted bunker. Aerial photography can also be used to locate soil- and crop marks. At the battlefield of Fontenoy (1745) traces of common-graves have been detected on aerial photographs.27 A similar research may be used on similar battlefields like the one at Lafelt, Belgium (1747), maybe in combination with historic maps showing ditches and inclines in the landscape which may have been used to bury the dead.

[27]Personal communication with Mr. A. Tripnaux.

Satellite imagery is also very useful, especially when studying areas which are hard to reach or which are almost inaccessible or when other geophysical survey methods are impractical to a specific area or landscape. Less than a decade ago satellite imagery was hard to obtain and it was quite expensive. Landsat was already available when free software like Google Earth and Google Maps became available in 2005/2006. It was now possible for everyone with a PC and an internet-connection to explore the world from the sky by studying free satellite images depicting virtually every location on the earth's surface. High resolution images became cheaper to obtain. Within five years Google Earth has perfectly integrated in Western society, being well used by many archaeologists to locate and investigate archaeological sites or to investigate possible areas of archaeological interest. In short: satellite imagery has become readily available for archaeologists. Although the recent pseudo-scientific television-documentaries presenting her work in Egypt are of a doubtful quality, a good book about satellite remote-sensing was recently published by Sarah Parcak (Parcak 2009).

The same can be said about aerial photography. Aerial photographs can be taken from any flying platform. This can be an airplane or a satellite, but also a small drone or UAV (Unmanned Aerial Vehicle). UAV's are remotely or radio-controlled and they come in different sizes and shapes, including blimps, balloons, miniature airplanes, miniature helicopters, powered paragliders, blimps, balloons and kites (Bendea et al. 2007; Eissenbeiss 2004; Everaerts 2008; Verhoeven et al. 2009, 126). A special kind of UAV under development at the University of Ghent is the Heli-Kite (Verhoeven et al. 2009). A UAV is relatively cheap and easy to use and provides excellent aerial photographs. It can be flown at high and low altitudes and it can be outfitted with a GPS tracker to display the spatial distribution of the photographs it takes (Figure 30). UAV's can be controlled manually or autonomously (Eisenbeiss 2004, 3). Just like in a pedestrian survey it can follow a predetermined line or grid, taking pictures at selected intervals while using commercial digital cameras. Aerial prospection can further be undertaken by applying laser-altimetry methods like gradiometry and LIDAR, which provide a detailed 'scan' of the terrain and its features, looking through woodland canopies (Cheetham 2008, 575-576; Parcak 2009, 121). A good example of its application in conflict archaeology is the gradiometer survey at Pointe du Hoc, described in chapter 3.2.1 (Master & Stichelbaut 2009, 282).


***Figure 30*:** A Yamaha R-Max remote-controlled survey helicopter or UAV outfitted with a camera and GPS tracking system (Everaerts 2008)

When remote sensing, field-survey and historical research have indicated the potential of an area for archaeological research actual excavation can begin. The area can be inspected by taking corings before actual trial trenches are planned. The further methodology depends on the type of archaeological remains which is discovered. Human remains and graves for example are excavated differently than a bomb-impact crater or a trench. Conflict archaeology relies on traditional excavation techniques, but special kinds of archaeological traces deserve specific kinds of treatment which often involve contacting specialists. Conflict archaeologists may encounter live explosives and ammunition, recent mass graves, collapsed structures and other potentially dangerous materials which need to be removed and studied without being hazardous to the archaeologist and the environment. Excavating bunkers and trench-systems asks for creative planning and improvised excavation, adopting techniques from other academic studies like forensic archaeology, as well as techniques employed by military bomb-disposal units.

Next to selective- and trial-trenching full scale excavation may be undertaken when features like a trench-system or a camp are investigated. The conflict archaeologist should be aware of the possible dangers involving the find-material at the site and process them properly in a risk-analysis while planning the excavation. In the end a complete conflict-archaeology project involving the study of a battlefield can typically consist of desk-based research, survey and prospection, a metal-detector survey and finally possible trial-trenching and excavation. Conflict archaeology as a discipline within the field of archaeology thus follows the standards and procedures of traditional archaeology, but just like every other specialised field of archaeology it uses specific sources and methods which may differ from those applied by traditional archaeology. By introducing new

theories and methods conflict archaeology contributes to existing sub-disciplines of archaeology, just like they contribute to the field of conflict archaeology.

### 5.2 The Digital Age

In the present day the use of computers has completely integrated in human society. The digital world evolves ever faster. The use of computers and archaeology has been well studied in a publication by Lock which focuses on archaeological computer applications involving GIS, satellite photography, three-dimensional reconstruction, spatial modelling etcetera. In 2003 Lock already predicted that "...computers will play an ever increasing role in the diverse process called archaeology" (Lock 2003, 268). In the present day the use of computers and computerised equipment has indeed become well integrated in the field of archaeology. The introduction of the commercially available internet in the mid nineteen nineties has changed the world at a tremendous scale. In archaeology it has been used during the last decade to quickly announce and advertise projects, to publish results and articles online, to share and send data and to quickly attract group of interested specialists. A good example is the Hougomont-project , which aims at preserving the Hougomont farm on the battlefield of Waterloo, Belgium (1815). Lock also mentions this phenomenon in his book as digital *fora* which, when made accessible can be used by everyone for debate (Lock 2003, 267). A few years after the book was released the social media websites like Facebook became available.

Regarding the Hougomont project a Facebook-group has been created and professional conflict archaeologists and the Centre of battlefield archaeology from Glasgow University have been rapidly attracted to the project, becoming involved with the actual developments and collaborating with the ongoing research.[28] The pool of interested volunteers and contributing specialists keeps on growing, with the online message boards being their daily place of discussion. It is not necessary anymore to meet at a congress to quickly exchange some ideas with colleagues. Instead, online message boards, chat-boxes and e-mail are used to discuss research ideas while sitting behind one's own desk. The world has become smaller, data can be exchanged by merely clicking a button and specialists from all around the world can be contacted or mobilized within a day. Just like any other field of archaeology the digital media are intensively applied to Conflict Archaeology as well.

[28] www.facebook.com/groups/projecthougomont/

Digital advancement has also led to the introduction of Geographic Information Systems and cheap hand-held GPS systems which now play an important role in archaeological research. New GIS modules are created on a large scale, also related to conflict archaeology. Satellite images are readily available on the internet and working at home has become a lot easier since articles and books can be found online, where it used to be customary to travel great distances to read certain books needed for research. It can be expected that digitalisation will greatly influence and aid the advancement of conflict archaeology in the foreseeable future.

### 5.3 (Re-)living the Past: Re-Enactment and experimental archaeology

It is easy to speculate about the effectiveness of musket-fire based or to write about the terrifying mounted Mongol archers of Ghenghis Kan from behind a writing-desk, without ever having fired a musket or ridden a horse. Without the practical knowledge of these subjects related research and its conclusions may be incomplete or faulty. People learn fastest by actually doing something 'hands-on.' If one wants to know is something is possible, it can be empirically tested, so when an archaeologists wants to know if the obsidian knife he found is usable to cut leather he can use the knife or a technical replica to actually test his hypothesis. Every archaeologist in the field will wonder how the site he is investigating looked like in the past or how the artefacts that he found were actually used. Each year in June the battle of Waterloo takes place again near Hougoumont and La Haye Saint. So-called re-enactors spend an entire weekend actually living and acting like the soldiers of the Duke and Wellington and Emperor Napoleon which occupied the battlefield in June 1815. Historical re-enactment of similar battles takes place around Europe and the United States on an increasing scale and archaeological theme-parks in which one can 'wander through the past' are present in many countries world-wide. In some of these parks the visitor actually wanders across or even 'through' an archaeological site, like at Pompeii or the Roman Archaeological park in Xanten, Germany.

Battlefields are often reconstructed and re-enactors can be present there to give the audience an impression of the events that took place on the battlefield. An excellent example is the battlefield of Culloden or Drummossie Moor in Scotland. A detailed museum with many artefacts is located next to the battlefield and the field itself has been reconstructed in terms of landscaping and vegetation. Once the visitor enters a specific part of the battlefield a GPS-device tells the visitor about this location, providing a lot of background information and pictures on a small screen. Together with daily performances by re-enactors and the visual and audio-displays in the museum, the battlefield is re-

constructed in front of the eyes of the visitor in the same way an archaeologist reconstructs the battlefield in his mind when investigating it. Culloden has also spawned a lot of experimental-archaeology projects, of which one will be discussed later on. It has been one of the flagship projects of the Centre of Battlefield Archaeology of the Glasgow University.

Historical re-enactment focuses on the re-creation of a specific historical event, like a specific battle (Luzader & Spellman 2006, 88). This event was however not an isolated happening somewhere in history, but it was part of a dynamic and living system. Re-enacting a certain historical event also invokes the participants to re-enact this surrounding system. Actors taking part in actual historical re-enactments often take their role seriously. They study the role they are playing and the associated social, cultural and material in detail, enacting 'living history.' In living history "*Participants see themselves as actually living history, i.e. living through historical events which they are re-enacting. They present past events as though they are contemporary and thus make history come alive"* (Coles & Armstrong 2008, 2).

Of course these living history events are not direct copies of the past, for the direct connection with the past is lost. Based on historical and archaeological knowledge the actors try to reproduce the life of the past through using authentic methods, techniques, materials, crafts and practical knowledge they gather by the re-production and usage of ancient artefacts like tools and weaponry. They want to stand as close as possible to the past and archaeology is one of the tools providing them with inspiration and information. Although most living history actors are merely practicing their hobby, their actions may also be important to the study of history and archaeology. Just like archaeology can complement documentary sources, re-enactment of the past can complement archaeology by providing practical knowledge about artefacts and techniques.

A division can be made in the field of historical re-enactment between recreational re-enactment and academic re-enactment. Recreational re-enactment is undertaken as a hobby by re-enactment societies. Because of the personal effort, eye for detail and years of experience many of these societies can provide interesting information about the artefacts and techniques they use. Academic archaeologists and specialists may also undertake forms of historical re-enactment. A good example of academic interest in re-enactment is experimental archaeology. Experimental archaeology is well defined by Mathieu: "*Experimental Archaeology is a sub-field of archaeological research which employs a number of different methods, techniques, analyses and approaches within the context of a controllable imitative experiment to replicate past phenomena (from objects*

*to systems) in order to generate an test hypotheses to provide or enhance analogies for archaeological interpretation"* (Mathieu 2002, 1).

Mathieu further recognises four aspects of experimental archaeology (Mathieu 2002, 2-6). Before mentioning them it should be noted that there is a critical difference between reconstruction and replication. Replicating is the copying of a certain object or techniques without involving the proper process of creation and development, whereas reconstruction also aims at the development and construction of objects and processes and requires interpretation of these processes (Luiting 2009, 32-33). Object reconstruction or technical replication is the reproduction or recreation of ancient artefacts and models, which can either be visual replicas or functional replicas. The replicas are often created using authentic materials and appropriate techniques, especially when they are being used for academic investigation. Behavioural replication or functional reconstruction focuses on the generation and testing of hypotheses concerning the function and use of artefacts and weaponry. Replicated objects are used to test hypotheses and to answer questions about the practical usage of artefacts. Process replication focuses on the reproduction of past processes using authentic techniques like metalworking, bronze-casting, ship-making, weapon production etcetera. System replication links all these processes together to create a possible living system as it is studied by living- or ethno-archaeology. System replication often takes place in open-air museums or at specific battle-re-enactments. The annual battle of Waterloo re-enactment for example encompasses camp life, the production of artefacts and weapons, the daily life of the soldiers and the battle itself displaying authentic tactics and using replicas of uniforms and weapons. The living system of life around the battlefield is partly replicated here.

Experimental archaeology in the field of conflict archaeology mainly focuses on object- and behavioural replications in order to answer hypotheses and questions in current research and answering the credibility of assumptions made during research. One of the most important types of artefacts involved with conflict archaeology is weaponry and military equipment. The replication and testing of weapons and military equipment have provided interesting results which indicate that historical sources do not always provide accurate data. The work of Kristiansen for example has shown that Bronze Age swords can be used as practically functional weapons, although it had previously been assumed that the weapons merely had a ritual function (Figure 31) (Kristiansen 2002). David Fontijn from the University of Leiden and author of *Sacrificial Landscapes* has undertaken similar experiments (Fontijn 2002).

***Figure 31*:** Kristiansen illustrating how to wield replicated Bronze Age swords. The image on the right shows experimental battle damage on the edge of the blade of a replicated sword (Kristiansen 2002, 321 & 325).

Another example is the technical and behavioural replication of an 18th century Brown Bess musket replica in order to study the accuracy of the weapon. Historical sources often mention that the Brown Bess was very inaccurate (Rogers 1972, 94). The experiments undertaken by Roberts, Brown, Hammet and Kingston however proved that the weapon was fairly accurate, placing the blame with the ones who operated the weapon or the way in which they operated it (Brown et al. 2008, 19). In order to achieve reliable and thus usable results when undertaking a behaviour replication using a replicated object, both research and researcher have to apply to several criteria. In order to achieve the best results:

- Authentic materials and techniques should be applied during object replication.
- Authentic techniques (when known) should be applied when using the replicated objects. When no techniques are known ethnographic or historical parallels may be used.
- Practical experience of behaviour with the class of replicated objects is needed. Knowledge of the usage, maintenance and possibilities of the artefact can be mastered this way.
- Replicated objects should be a technically accurate as possible to the original in order to achieve similar performance as far as this is possible.
- Conditions of certain behavioural replications should be similar to the past conditions (temperature, distance, terrain, weather, humidity etc.)
- All possibilities should be left open and every assumable possibility should be tested.

- The researcher should be accustomed with theoretical knowledge about the archaeological and historical background of the artefacts, their development and their historical and context in ancient society.

Using authentic materials and techniques provides the highest degree of reliability. The musketry-investigation by Brown, Hammet and Kingston mentioned before is a good example. A technical replica of a Brown Bess musket was used to fire at several targets and a soft-capture box. The targets consisted mainly of ballistic gelatine covered with the replica equipment and clothing worn by Jacobite Highlanders at the battle of Culloden. A steel plate, ceramic plated body armour and a pork-ribcage were also used as targets. Domesticated pig (*Sus domesticus)* remains are generally used in taphonomy and physical anthropology, since they closely represent the tissues of the human body (Morton 2002, 157). The musket-model was tested on several distances from its target, the standard being 137 meters, the typical range for 18th century conflicts (Brown et al. 2008, 10). The exact type and fabric of powder, linen, paper and balls used was not known, but the replicas used were as closely reconstructed as possible using documentary and archaeological sources. It was however noted that the performance of the musket while being used in the field depended on the physical characteristics and the physical and mental state of the shooter, as well as weather and other environmental factors. The project only focussed on the ballistic capabilities of the Brown Bess musket (Brown et al. 2008, 3). Re-enactment and field experiments are needed to investigate the capabilities of the weapon and its shooter in the field. The focus would then shift from object-replication to behavioural replication.

A project focussing on behavioural replication has also been inspired by Culloden, just like the aforementioned musketry project. Prior to the battle the Jacobite Army tried to launch a night-attack on Nairn, where the British/Hanoverian army had established camp. The march was later aborted due to the exhaustion of the soldiers and the bad weather conditions. The march, along with other parts of Jacobite marches through the Scottish highlands, has often been undertaken by Jacobite enthusiasts, often wearing authentic gear for the period. Unfortunately most of the people undertaking these marches do not possess the same physical fitness and mindset of the 18th century soldiers before the battle of Culloden. One of these marching events was organised by Dr. Tony Pollard using 18th century marching maps. Pollard also employed experienced re-enactors in order to study the condition and morale of these men (Wade 2009). British Marine reserves and Territorial army units also re-enacted the night-march in 2011 in order to train for deployment in Afghanistan. Their physical fitness probably better resembled that of the

Jacobite troops in 1746. Most of the soldiers hadn't slept for 24 hours, further simulating the stress of sleep deprivation which must have also affected the Jacobite troops.

A well-organised and planned re-enactment of this kind also took place between 30 April and 23 May 1985 when Dr. Marcus Junkelmann and a group of friends marched from Verona to Augsburg using ancient Roman routes and being clad in authentic 1st century Roman gear, re-enacting the marching conditions and camp-life of the Roman army. They had all trained meticulously for this event and since there were archaeologists, historians and specialists among them their gear was completely reconstructed from known examples. Their training gave them the needed physical fitness. It should however be noted that the men were marching voluntarily and that they were still 20th century people living in the 20th century environment, contrary to their Roman counterparts. Nonetheless this experiment has provided many insights into the life of Roman soldiers, their living conditions and their life while marching. Roman military equipment and other artefacts were also tested and new insights were gained into the techniques used to handle these artefacts. Object and behavioural re-creation were of great importance here, but process replication was also undertaken in the shape of the entire camp-life including cooking, reparation of equipment, building of fortifications and manufacturing of small artefacts (Junkelmann 2003).

***Figure 32*:** Marcus Junkelmann and his academic re-enactors visiting a reconstructed *limes* watchtower in 1988 (http://www.fectio.org.uk/sites/limes1973b.htm).

Practical experience is of great importance when investigating past activities. Theoretical knowledge can provide interesting insights in the matter, but experimental archaeology and specialisation on experimental disciplines contribute to our knowledge as well. Shackley for example studied the cut-marks on the skulls of victims from the battle of Kamakura in Japan (1333), buried at the Zaimokuza battlefield burial grounds (Shackley 1986). By studying the sharp-force trauma on 65 skulls she concluded that most

individuals had been killed by mounted warriors using a light sword like the *tachi* or *katana*, fighting in the traditional style of swordsmanship. Shackley however is not a specialist in Japanese swordsmanship. Her study was later criticised by Karasulas, who by the time did have 18 years of experience in Japanese swordsmanship. He corrected the incorrect jargon used by Shackley and he concluded that some wounds may have been caused by swords, but that others may have been inflicted by the *Yari*-spear and *Naginata* pole-arm (Karasulas 2004, 512-513). People participating in a behavioural-replication project should also be chosen to somehow represent the people from the past. Running across the battlefield in Roman gear for example should be done by well trained men who have a degree of physical fitness which may resemble that of trained soldiers from the past, while a rebel army of untrained militia for example can be replicated by people who lack the proper physical strength or knowledge of weaponry and tactics. When studying the effectiveness of archery the participating archer should have representative experience in his or her field and should use an accurate technical replica of the investigated weapon. Archery organisations should be contacted for example. Mounted archery from horseback which was practiced by many societies in the past can also be studied by contacting existing specialists. Many mounted archery organisations exist in the United Kingdom and the United States.

Other than weapons, vehicles have also been the subject of experimental archaeology. The chariot for example has been the subject of many discussions. Shooting from a chariot seems to be very difficult, but without practical experience no unequivocal conclusions can be drawn on the subject. Object replication has taken place using archaeologically recovered materials, like the chariots found in the tomb of Tutankhamun in Egypt. Using the existing knowledge about chariots, finds from Qantir and documentary and iconographic Egyptian sources were used to reconstruct a functional Egyptian chariot which is now on display in the Egyptian museum at Hildesheim (Herold 2006, 376-386). Behavioural replications is described by Gabriel and Metz, who mention an experiment using an experienced archer standing on the platform of a small truck. The archer used both a belly-bar and a leg-loop to stabilise himself. The ‘chariot’ drove over uneven terrain at the estimated combat speed of 12-20 KM/H. The archer achieved impressive results firing at anatomically correct targets (Gabriel & Metz 1991, 78-79). It is proven that firing from a platform at the mentioned speed is possible by a mounted archer, but firing from an actual chariot powered by horses may still have been very different. Tests with a technical replica of a chariot, an experienced charioteer and appropriate horses should be undertaken to gain even better insights into the matter.

Historical reconstructions of ships have been built in several countries, using original methods and techniques. Behavioural reconstructions and replications have also been undertaken by living and navigating the reconstructed ships. Some examples are the Viking ships from the Roskilde Viking Ship museum like the Skuldelev ships or the Bremen Cog (Moeyes et al. 2009; Croome 1999; Crumlin-Pedersen 2000). Once again the importance of expert knowledge is stressed here. Knowledge is not only needed about the construction techniques of ships, but also about techniques used to sail and navigate the ships once they have been reconstructed. Organisations and funds world-wide are also dedicated to the reconstruction and restoration of military vehicles and airplanes in order to keep them flying and rolling. The owners of these vehicles often obtain a lot of technical and operational knowledge about the vehicles, which can be useful to a conflict-archaeologist dealing with remains of these vehicles.

One of the most remarkable, but also the most modern methods for historical re-enactment is the digital re-creation of the past and in the case of conflict-archaeology the re-creation of battlefields and landscapes of conflict. The virtual re-creation of sites and landscapes including vegetation has been studied at Kilmartin, Scotland (Winterbottom & Long 2006, 1358). Further possibilities of 3D modelling in the field have been tested at the archaeological site of Sagalassos in Turkey as part of the Murale-project (van Gool et al. 2002). By using 3D modelling software complete three-dimensional models of battlefields can be made, using GIS data and maps to re-create the landscape in which a conflict took place. This makes it possible for the archaeologist to first reconstruct the landscape and then take a look at the digital battlefield, enabling the observer to actually 'stand' on the battlefield as it looked like in the past. The digital model can also be provided with smoke and weather effects and moving models of soldiers and vehicles, making it possible to gain a first-person view into a battle or battlefield.

Just like in computer-games, digital 3D models can be made interactive, making it possible for the archaeologist to actually re-enact a battle or event in a digital environment. The application of computer-simulation has been adopted by military branches around the world. The latest development in this field is the so-called VBS, or Virtual Battle Space programme, developed by Bohemia Interactive, which is available to civilians as the computer-game 'ArmA: Armed Assault.' VBS is a visually highly detailed virtual battlespace which can be modified to resemble any kind of battlefield. Weather, lighting, civilian life etcetera can all be modified. Vehicle simulators can be linked to the virtual battlespace and individual soldiers can be completely outfitted while operating from their personal computers. Realistic graphics, weather, audio and ballistic models make it possible to create digital battles and to test battle-scenarios without

actually using real weapons and equipment. Many modules have been developed to train soldiers for different kinds of situations an scenario's, from situational awareness in Afghan villages up to full-scale battle-scenarios.VBS is used by most NATO countries for several years now. Virtual battle spaces like these can also be created for past-battles, making it possible to actually recreate complete digital battlefields.

The battles fought on these digital battlefields are often pre-enactments and preliminary scenarios. Using a Virtual Battlespace including modelling software related to other periods, like ballistic models for 18th century muskets or marching models for Roman troops, would make it possible to digitally re-enact historical battles. The Total War Series is well appreciated with many gaming archaeologists and historians. In these games the player manages an historical empire and leads armies onto the battlefield. These battlefield scenes are highly detailed and give a good insight into the experiences of the soldiers and their commanders during historic battles. Independent modifications are made for the games to include more realistic ballistic systems, marching orders and authentic units. Playing the Total War games will allow the player to experience the battles and battle-tactics used by different factions in the Roman Period, Feudal Japan, Medieval Europe, 18th Century and the Napoleonic Era. A combination of the basic concepts of the Total War series together with a Virtual Battlespace would allow academics to digitally re-enact detailed historical battles and to test their hypotheses on the digital battlefield.

Other computer-games have specialised in digitally re-creating existing historical battlefields. A good example of this is the Gearbox Software computer-game franchise *Brothers in Arms*. This computer-game series aims at providing a realistic experience, placing the player in the jump-boots of a U.S. 101st Airborne Regiment squad leader during Operation Overlord and Operation Market Garden in the Second World War. Very detailed historical research was undertaken by the game developers in order to faithfully reconstruct parts of Normandy and the Netherlands in 1944, so that it actually becomes possible to walk and fight in actual digital historical environments. By adding a high degree of realism, a storyline and character-development of the squad-members the game also enables the regular player of a computer-game to gain a deeper insight into the lives and situations in which the US paratroopers lived and fought in the past. Apart from some historical errors the game aims at being as realistic as possible.

***Figure 33*:** Footage from the Gearbox Software computer game '*Brothers in Arms: Road to Hill 60'* showing the digital reconstruction of the house at '*Dead Man's Corner'* near St. Côme du-Mont in Normany, France (Rejack 2007, 419).

### 5.4 The Public

Public fascination with battlefields and past conflicts is not only reflected by re-enactment, but also by books, films, museum visits and battlefield tourism. According to Sutherland and Holst there is "general public support for the study of battlefields through their educational, financial and emotional involvement" (Sutherland & Holst 2005, 7). Battles evoke emotion through memory and experience and battlefields and museums are used to reflect these concepts upon their visitors. This general public van best be defined as "groups of individuals who debate issues and consume cultural products and whose reactions inform public opinion" (Merriman 2004, 1; after Melton 2001, 1

In order to oppose the distribution pseudo-scientific and unscientific information via the modern media education via these same media should be applied. Tony Pollard for example is known for his engagement in educational projects with the military, educational documentaries, television- and radio interviews and his critical debate in online forums and social media. The presentation of battlefields and museums related to conflicts and battlefield tourism are well discussed subjects in the field of heritage management to which conflict archaeology is thus also related. The public however does not merely desire education, but rather conversation with the archaeologists and the historical heritage (after Merriman 2004, 11). Of course professional archaeologists have to beware of a too large public influence which will result in uncritical approaches and an overall unscientific approach.

Members of the general public can be involved with a conflict-archaeological project in several ways (Mapunda & Lane 2004, 215-218). First of all the can be involved in project assessment and planning. Land-owners or farmers on whose land a battlefield is located are of course already informed before the project takes place. Their opinions and ideas should be observed and noted. Members from local communities and interest groups like local organisations of heritage enthusiasts and amateur-archaeologists should also be invited to an information meeting where they can express their ideas and suggestions. This way they can contribute to the project and converse with the archaeologists as well as their heritage. During the project education is still important. It should be possible for those who are interested to visit the site under guidance. Guided tours do not only raise the interest of people, but it also closes the gap between the local community and the 'distant' academic archaeologists working behind the coloured tape. School children in particular should be allowed to visit the site, since they are often enthusiastic and they are still engaged in general education. If they are interested in the project they can be invited to participate in the project as volunteers.

In order for people to participate they should be allowed to engage in actual field-work. They should first receive a quick briefing and short training in the activities they will have to undertake in order for them to work efficiently. This might be done by local amateur-archaeologists or an archaeologists involved with the initial project. Amateur-archaeologists can also be employed as fieldwork-leaders for groups of volunteers, which can then undertake basic fieldwork like sectioning soil-marks or cleaning trench surfaces. This is often actively done at existing archaeological projects like Nieuwengein-Blokhoeve in the Netherlands (van der Feijst & Blom 2010). The High Pasture Cave Project on the Isle of Skye in Scotland fully relied on the participation of specialists and a large group of international volunteers and students of archaeology (Birch et al. 2005). In Near Eastern archaeology the local workforce of men on excavations is often drawn from nearby villages and towns. Local people have been involved in archaeological fieldwork there for decades. At Tell Sabi Abyad in Syria for example students of archaeologists are trained as square-supervisors overseeing a small workforce of locally employed men.

Priority should be given to recruiting and actively making use of people who already possess useful knowledge. In conflict archaeology metal-detectorists play an important role. They have often scoured a local battlefield for a long time and they may already possess an archive of artefacts recovered from the field. It is important to educate these people about the importance of proper find documentation and registration and paying attention to the archaeological context. Personal experience indicates that many detectorists fear for having to hand in their found 'treasures.' They may sometimes be

very reluctant and suspicious towards archaeologists and do not merely want to be educated. They should be told why registration is important and also how they should do this. Sutherland and Holst emphasise the use of detectors only in a planned field research, warning that unscientific use of metal detectors may lead to a loss of data (Sutherland & Holst, 2005, III). Unprotected sites are threatened by detectorists. At Marston Moor for example a large detectorists group threatened to remove a lot of artefacts in 2003 (Sutherland & Holst 2005, 17).

Unregistered metal detecting is a form of looting which does not only disturb the archaeological features related to the battlefield, but other archaeological deposits as well. It is also prohibited in many parts of the world. Appendix C provides more information about looting and the associated dangers. When detectorists are well briefed and invited to work along, they often become very enthusiastic. Their professional knowledge of working with the detector and their vast amount of experience can then be applied in a metal detector survey, working together with professional archaeologists. A good example of this is the collaboration between archaeologists and detectorists which was first employed at Little Bighorn, leading to good results (Scott el al 1989, 25). A more recent example is the detector-survey at Prestonpans (Pollard 2010). ZOLAD+, the local archaeological service of the municipality of Riemst in Belgium has organised several information meetings for local detectorists at the Lafelt battlefield (1747). The detectorists have been instructed on the techniques and importance of finds registration and they have been provided with a special permit to walk in designated areas. Whenever they go out into the field they report their findings, take the needed measurements and report them back to ZOLAD+. Finally the public should be provided with the results of the research by presentation like lectures, exhibitions and re-enactment of a battle. Low-cost and popular publications, as well as professional publications should be available to the public and the participants in the project (after Mapunda & Lane 2004, 215). It gives the people something concrete. The published results can be used for further education and to raise awareness for preservation and battlefield tourists while keeping the public in contact with its heritage.

## Conclusion

Conflict archaeology is a relatively new discipline of archaeology which specifically studies the remains of violent conflict in the past. Archaeological traces of violent conflict and warfare have been properly studied in detail by many archaeologists in the past two centuries from their respective fields of archaeological interest, but the development of conflict archaeology as a unique sub-discipline of archaeology only started to develop in the late nineteen-eighties. Conflict and warfare outside of the field of military history have been regarded as unsuitable academic subjects during the largest part of the twentieth century due to the negative collective memory of the two world-wars, which resonated in the academic world and the New Archaeology. The number of veterans and survivors from these wars is rapidly decreasing and the next generation of archaeologists is gradually moving away from the collective memories of the world-wars. The increasing number of wars being fought during the second half of the twentieth century, the increased media attention for war and violence and the increasing integration of archaeology and anthropology and advances in the study of antagonistic behaviour in anthropology have led to a better acceptance of conflict studies.

During the late twentieth century conflict archaeology could gradually start to develop. Around 2006 conflict archaeology became an established discipline in archaeology when the Centre for Battlefield-Archaeology was founded in Glasgow. Its field of research is however more comprehensive than merely studying battlefields and it quickly adopted the term conflict-archaeology, studying the specific social phenomenon of armed conflict through its material deposition from the past. After studying available definitions and analysing the subject of conflict archaeology in detail it can be defined as: *"The research of the material remains of past conflicts, battles and military activity in order to verify and complement military history, to preserve military heritage, to provide additional information on battlefields, to study the development and application of weaponry and technology and to study the impact on the physical and psychological landscape and its inhabitants, as well as later generations inheriting the local physical and social landscape and of conflict."*

Military history and conflict archaeology belong to the same field of research. Some aspects of conflicts have been well documented in writing or in depiction, but writings are not objective, they are subject to gate-keeping and their reliability can be questioned on many grounds which have been discussed in chapter 2. They often only tell a little part of a complete story. The archaeological record contains evidence for actions of conflict which have not or only partially been documented and which only become visible

through material remains in the archaeological record. Conflict archaeology can thus be used to study those aspects of conflict which have not been recorded in documents and it complements and validates documentary sources. It provides material evidence next to documentary evidence.

Where many archaeologists tend to 'think' in sites or periods, conflict archaeology studies the material remains of a universal social phenomenon world-wide. One of the strengths of conflict archaeology is thus that it is not bound to a specific spatial or historical setting, but can be applied to virtually any period or place in human history, from prehistory up to the modern day. It widens the scope and time-scale of archaeological research and stresses the study of the post-1500 period up to the recent conflicts in Iraq and Afghanistan, which should not be regarded as one 'modern era' but as different ages with different wars and technological distinctions. The study of ammunition, military vehicles, fortifications and other remains of these 'modern' conflicts also deserve proper archaeological study in order to contribute to the reconstruction of the past. Where musket-ammunition is often still regarded to be a recent disturbance it should be regarded to be an archaeological artefact. It deserves just as much attention as a Neolithic arrowhead or a Roman *fibula*.

Conflict archaeology can be used in a military-historical to study military technological advancement or to reconstruct battlefield in order to study the course of the battle and the tactics which were used. By placing a certain battlefield or site inside a wider physical and social landscape of conflict patterns like migration, destruction and alteration of the landscape, settlement patterns, local architectural development, distribution of goods etcetera can be studied, contributing to the wider study of history and archaeology in the region. Landscapes of conflict are often landscapes of death and they may contain human remains belonging to soldiers and civilians from different factions and with a wide range of nationalities. Conflict archaeology has a moral function here: the location, recovery, identification and possible repatriation of the casualties of conflict, especially military ones in which the co-operation between archaeology and the government is of importance. Memory, remembrance and honour are abstract concepts which play an important role here as well Uncovering mass-graves and material remains of genocide as evidence for war-crimes is also an important function of conflict archaeology in the juridical field.

The preservation of cultural heritage like battlefields and landscapes of conflict has also become a necessity in today's urbanising society. The rapid expansion of landscape development projects and human occupation of the landscape severely threatens most historic battlefields. The commercial availability of metal detectors has led to the quick looting of these battlefields on which metal artefacts are often the main archaeological indicators. problems in heritage management and education as well as targeted participation of the public should be encouraged in order to raise awareness about the importance of the preservation of historic battlefields as part of cultural heritage.

From the ongoing discussions and literature it becomes clear that a field of conflict is a complex concept of a contested landscape in which many different social groups take different kinds of interest. A few hours of fighting in the past may go a long way leading to conflicting issues even in the present day. Should a battlefield be treated as a plot of land which has been used by people to fight on or is it hallowed ground on which heroes fought and died for ideals like freedom and independence? Conflict archaeology is used to contribute to the ongoing discussions and heritage issues in the present. It is thus not only digging into the gruesome past of violent human behaviour, but it is trying to learn from the past to learn how to model and build the future.

Conflict archaeology actively educates the public through participation in archaeological projects, through the study of battlefields as museum sites, through published books and documentaries, through lectures and many other media, while also serving the public by the recovery of war victims, by providing evidence for war-crimes and by making the public aware of the cruelty and actuality of wars, which are still raging throughout the world. Conflict archaeology is partially a form of public archaeology and it thus has the potential to receive a lot of public attention. It remains an important valid and representative academic study and one of the main objectives of conflict archaeology as an academic discipline should also be to determine the boundaries of scientific and amateur research without becoming pseudo-scientific, but to remain open for the input from the non-academic public. Where amateurs often focus on the recovered objects and artefacts themselves, professional archaeology is a social science, focusing on the societies behind the material culture that is studied.

The study of conflict archaeology is highly interdisciplinary and it integrates with forensic studies, ballistic studies, experimental archaeology and other fields of research. By assessing the change in opinions and paradigm from the existing literature it has become clear that conflict archaeology also creates tension within the pre-defined boundaries in the existing paradigm like those between military history and archaeology,

history and pre-history, right and wrong, rebel and hero, primitive and pre-state. Conflict archaeology is thus very broadly applicable, making it necessary for the conflict archaeologist to be aware of the methods, theories and current issues in different fields of academic research. The use of good definitions and detailed background knowledge of different cultural areas and historical periods are prerequisites for conflict archaeologists, but may also be the cause of confusion.

Although conflict archaeology can be regarded as an independent sub-discipline of archaeology, it is also applied by professional archaeologists in other sub-disciplines of archaeology during existing projects when depictions of war or actual weapons or defence-works are encountered for example. In Scandinavia, Belgium and the Anglo-Saxon countries conflict archaeology has been well established and specialised conflict archaeologists are specifically researching battlefields and landscapes of conflict. In other countries remains of conflict are often dealt with by professional archaeologists who are not specifically investigating conflict-related data. Conflict archaeologists play an important role in supporting archaeologists from other fields of archaeology with their expertise and knowledge of conflict situations and the associated methodology. The promotion of conflict archaeology through professional and popular literature, as well as academic presentations and the modern media can greatly contribute to the integration of professional conflict archaeology into the current archaeological paradigm.

The general influence and importance of conflict archaeology are already rapidly increasing. Conflict archaeology has come a long way and it has become an established discipline within the study of archaeology in several countries. Other countries are becoming more aware of the importance of conflict archaeology. The Netherlands has recently adopted the study of the Second World War in its archaeological framework which might be the first step toward a better understanding and integration of conflict archaeology and future work is to be undertaken here.

Professional conflict archaeology has positively influenced the current archaeological paradigm. It stresses the importance of the study conflict, intentional violence and warfare, dealing with its associated material remains in a professional way, without becoming pseudo-scientific. It is highly interdisciplinary, helping to further integrate heritage management, military history, forensic and ballistic studies and many other themes with archaeology. It has also led to the renewed study and re-assessment of existing archaeological data regarding conflict and its associated types of artefacts. Ultimately conflict archaeology objectively investigates the violent past of *Homo sapiens sapiens* without glorifying war or violence. Instead it leads to a deeper understanding of

the causes and effects of violence and warfare on human societies and it may provide interesting lessons for the future.

With the increasing number of participants in conflict archaeology projects, conferences, research groups and conflict studies, the increasing appearance of subject-related literature and the increasing amount of conflict archaeology projects world-wide it can be safely assumed that conflict archaeology will be taught at most major universities which have archaeology in their curriculum within a decade. In the meantime conflict archaeologists have their work cut out for them. Conflict archaeology is still dealing with prejudice, obscurity and some minor obstacles and there is a lot of awareness to be raised among the public as well as professional archaeologists about the uses, importance and practical knowledge of conflict archaeology. The future is however sunny for the study of the darkest parts of human history.

**Abstract**

Conflict archaeology is a relatively new sub-discipline of archaeology which specifically studies the remains of violent conflict in the past. It has gradually developed during the twentieth century. Conflict archaeology as a specific sub-discipline of archaeology developed mainly from the nineteen-eighties onward up to 2006 when the Centre of Conflict-archaeology was created in Glasgow. From this moment conflict archaeology was established as an academic discipline. The *Journal of Conflict* and *Fields of Conflict* conferences now combine the research results of the world's conflict archaeologists.

This thesis examines the influence of the development of conflict archaeology in the late twentieth and early twenty-first centuries on the existing archaeological paradigm. The definitions of war and conflict are first discussed. Then some basic theories about the origins of violence and conflict are discussed. The research then focuses on the material evidence of conflict in the past. Special attention is given to documentary sources and their relationship to conflict archaeology, as well as several sub-disciplines of conflict archaeology which are currently developing. The archaeology of ammunition for example has not received much attention in archaeology, but its scientific potential is researched in this thesis. The archaeology of defence-works and military vehicles, as well as conflict-related graffiti is given special attention. The archaeology of weapons is not included in this thesis due to the immense size of this particular subject.

The research shows how conflict archaeology has developed and it illustrates the problems associated with its development. It also highlights several important ways of thought which define the current paradigm of conflict archaeology, like the multi-disciplinary approach of conflict archaeology or the idea that conflict archaeology studies a social phenomenon which can be applied to human history in its entirety around the globe. It shows how conflict archaeology is related to other academic fields of research and how they mutually influence each other, especially the field of military history. Extra appendices are included containing information which could not be directly included in the main text, including conflict in prehistory, weapons trauma and the looting of historical battlefields.

The origins of conflict and the visibility of conflict in the archaeological and documentary record are the main focus of this research, illustrated by case-studies based on the study of the literature written by the leading experts in the field of conflict archaeology. In the end the thesis should illustrate how conflict archaeology developed, how it has influenced present-day archaeology and which potential it has for the future while providing guidelines, ideas and inspiration for the re-assessment of the current archaeological paradigm regarding conflict archaeology.

**Samenvatting**

Conflictarcheologie is een relatief nieuw subdiscipline van de archeologie dat zich specifiek richt op de overblijfselen van conflict in het verleden en dat zich heeft ontwikkeld gedurende de twintigste eeuw. Als een specifiek subdiscipline van de archeologie heeft conflictarcheologie zich vanaf de jaren '80 van de vorige eeuw ontwikkeld tot in 2006 het *Centre of Conflict-Archaeology* is opgericht in Glasgow. Vanaf dat moment bestaat conflictarcheologie als een academisch discipline. De onderzoeksresultaten van de conflictarcheologen rond de wereld worden gepubliceerd in het *Journal of Conflict* en op de *Fields of Conflict* congressen.

In deze scriptie worden de ontwikkeling van conflictarcheologie in de late twintigste en vroege eenentwintigste eeuw en de invloed ervan op het bestaande archeologische paradigma behandeld. De definities van oorlog en conflict worden allereerst onderzocht, gevolgd door basistheorieën over het ontstaan van geweld en conflict in het verleden. Daarna richt het onderzoek zich op de materiële overblijfselen van conflict in het verleden. Hierbij wordt speciale aandacht besteed aan documentaire bronnen en hun relatie met conflictarcheologie en aan verschillende subdisciplines van conflictarcheologie die momenteel in ontwikkeling zijn. De archeologie van munitie heeft bijvoorbeeld nog weinig aandacht gekregen, maar dit onderzoek besteedt ook aandacht aan het wetenschappelijk potentieel van het betreffende onderwerp. Ook de archeologie van verdedigingswerken, militaire voertuigen en conflictgerelateerde graffiti krijgen speciale aandacht. De archeologie van wapens is bewust niet in deze scriptie inbegrepen vanwege de grote omvang van dit onderwerp.

De scriptie toont hoe conflictarcheologie zich heeft ontwikkeld en toont de problemen die met deze ontwikkeling samenhangen. Het onderzoek schetst ook een beeld van de belangrijke denkwijzen die het huidige paradigma van de conflictarcheologie bepalen, zoals het multidisciplinaire karakter van conflictarcheologie of het idee dat conflictarcheologie een sociaal verschijnsel bestudeerd dat kan worden toegepast op de gehele menselijke geschiedenis, wereldwijd. Het laat zien hoe conflictarcheologie gerelateerd is aan andere academische onderzoeksgebieden en hoe deze elkaar beïnvloeden, met name de militaire geschiedenis. Extra bijlagen bevatten informatie over onderwerpen die niet direct in de hoofdtekst verwerkt kon worden, zoals conflict in de prehistorie, wapentrauma en het plunderen van historische slagvelden.

De oorsprong van conflict en de zichtbaarheid van conflict in het archeologische en documentair archief vormen de hoofdpunten van dit onderzoek, aangevuld met *case-studies* gebaseerd op literatuuronderzoek vanuit de publicaties van de experts op het gebied van conflictarcheologie. Uiteindelijk moet deze scriptie laten zien hoe conflictarcheologie zich heeft ontwikkeld, hoe de huidige archeologie erdoor is beïnvloed en welk potentieel er bestaat voor de toekomst. Daarbij worden er richtlijnen, ideeën en inspiratie gegeven voor de herwaardering van het huidige archeologische paradigma met betrekking tot het gebied van conflictarcheologie.

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**List of Illustrations**

**Appendix A: Organised violence in Prehistory**

It is not the question 'if' early hominids engaged each other in violent conflict, but 'when 'and 'why'. No specific data is available for the detailed life and conflict among early hominids. Some hominids display trauma, but it can often not be directly associated with violent conflict. Keeley mentions an example of an Australopithecus skull which was thought to contain spear wounds. After re-investigation these wounds turned out to be bite-marks inflicted by leopard canines (Keeley 1996, 36). The study of other animals, specifically primates, provides a lot of interesting information about the origins of violent conflict. Throughout the natural world violent conflict can be observed among many animals. Ants wage intentional wars with other colonies in order to protect their own colony (Van der Dennen 1995, 152). Intra-specific killings also take place among Hyenas, Hippos, Gulls, Langurs and primates (Van der Dennen 1995, 146). From these examples it seems that conflict is a universal phenomenon experienced by almost all life-forms, which are bound in multiple-conflict configurations and coalitions (Van der Dennen 1995, 12).

The biological approach to studying the origins of warfare is also concerned with ethology, the study of animal behaviour. According to ethology man, just like some primates, has a tendency to kill members of his own species, partially because of his emotional attachment to a particular territory. Human beings need personal space in order to function properly (Lider 1979, 6). A derivate of this behaviour can be seen in the present day. Many people need their own space within a house in which they can be alone, like the 'hobby room.' Critics of ethology have long claimed that primates do not show this 'territorial' violent behaviour, but they have been proven wrong.

Jane Goodall (1934-present) observed that deliberate intra-specific killing often takes place among primates (Van der Dennen 1995, 2). A milder form of intra-group violence, redirected aggression, can also be observed among primates. When an individual of group is attacked or threatened, it may respond by expressing the same kind of behaviour against a lower ranking individual that was not part of the original conflict (Boyd & Silk 2003, 239). This kind of conflict can also be observed among humans. Violent conflict can also take place between groups of individuals as a form of inter-group agonistic behaviour. This type of behaviour most often occurs among primates (Van der Dennen 1995, 158). It exceeds the level of violence between other animals since primates directly assault adversaries and undertake deliberate and violent raids deep into the territory of neighbouring groups in order to expand their home range by injuring others (Van der Dennen 1995, 181). Enemy males are killed and females are often 'captured' along with

territory (Leblanc & Register 2003, 82). This kind of behaviour can also be observed with tribal-level societies, as was described earlier in this chapter.

Leblanc observes that warfare in many non-complex societies is similar to chimpanzee-attacks (Leblanc & Register 2003, 83). Chimpanzees are often observed to have skeletal fractures and bite wounds inflicted during intra-group violence. Although they are unknown to specifically use tools to inflict damage to others, primates are known to throw objects at each other during conflict behaviour in order to intimidate others (Zollikofer et al. 2002, 6447). Primates also have the cognitive sophistication needed to develop a sense of cruelty (Van der Dennen 1995, 183). According to Richard Wrangham male chimpanzees are genetically programmed to dominate other males, also in their own group (Leblanc & Register 2003, 85). This genetic trait may also have evolved with the human species.

Xenophobia is also part of this behaviour. Xenophobia is the aversion against strangers which may trigger an aggressive attack. Goodall observed xenophobia among the Kahame chimpanzees, where two groups of chimps peacefully lived together. When they eventually parted, the groups started to view non-group members as enemies. They were violently attacked, but the attack-patterns differed from those of intra-specific killing. The victims were 'de-chimpised' (Van der Dennen 1995, 182). Likewise, opponents have been de-humanised in violent conflicts throughout history among humans. A good example can be observed in the battle for the Pacific in the Second World War, where the Japanese were demonised by U.S. soldiers (Sledge 2005, 246-247).

### 1. War and violent conflict in prehistory and Pre-state warfare?

Modern cross-cultural research shows that conflicts are more frequently fought in non-state or pre-state level societies than in state-level societies (Keeley 1996, 32). Since no true state-level societies are known to have existed in prehistory, violent conflict probably was common then. Archaeology can be used to study this hypothesis. There is no unequivocal archaeological data available that indicates warfare and violent conflict among early hominids, but archaeology can however be used to study warfare and violent conflict among early 'modern' humans. Tools, weaponry and remains of architecture exist from these periods, as well as skeletal evidence. These skeletons are the remains of human beings, actual agents, with their body being the main medium through which these ancient peoples acted and through which violent conflict was actually expressed by both displaying violence and by sustaining it. The best indication of violent conflict, or at least armed conflict in the past, is the human skeleton containing weapon traumas. Trauma refers to sustaining a bodily injury or wound (Roberts & Manchester 1999, 65).

Palaeopathology and forensic studies should be used to uncover the trauma that was inflicted to these people and to analyse the way in which the trauma was sustained. Skeletal material can also be used to study demographic mortality when present in good quantities (Armit et al. 2006, 6).

Next to the human body itself, human forms of material expression can be studied as indications of violent conflict and warfare in the past. Artefacts and most importantly weapons are the tools used to wage an armed conflict. Prehistoric weaponry can be divided into two categories: hand-held weapons or shock-weapons and ranged missile weapons. The first category contains knives, swords, maces, clubs and axes. These weapons are fairly easy to use and require no specialised knowledge of how to handle them. The second category does require specialised training and knowledge and consists of bows and thrown weaponry like slingshots or bolas. The spear can be used as a hand-held weapon as well as a ranged weapon. A javelin is s light kind of spear which is made for throwing, like the Roman *pilum*. The spear could also be launched from a spear-thrower, like the Aztec *atl-atl* which had a maximum cast of one hundred meters and an effective range of forty meters (Keeley 1996, 51). Hunting with spears mainly was a group-activity, which may have aided in the militarisation of social groups (Mercer 2006, 131). Keeley states that war had directly derived from hunting as means of acquiring that what one lacks from other people when it cannot be acquired peacefully (Keeley 1996, 162).

Weapons like knives, bows and spears were also used during hunting and they could also be used in daily life. Maces, battle axes and clubs however were not or hardly used during daily life or while hunting. Axes are heavy weapons mounted on a short shaft and could do tremendous amounts of damage to the human body in hand-to-hand combat. Although most battle-axes and normal axes are hard to distinguish from each other, some axes have an exotic form which makes them unsuited for civilian tasks. These axes were specifically designed for warfare, like the hammer-axes from the single-grave culture, also known as the battle-axe culture (Butler & Fokkens 2005, 395). Daggers and swords are also weapons which are purposely made for armed combat (Keeley 1996, 50). A distinction should be made between daggers and knives. Daggers are designed for combat. This means that they often have a narrow, reinforced blade which makes it easier to force the blade into the body of the enemy. A pommel is often mounted on a dagger to make the extraction from the body easier. The suction of the blood in the human tissue makes it hard to extract the dagger (Mercer 2006, 124). Swords and rapiers were superior weapons in many ways, which made them symbols of status and prestige.

The sling-shot is known as one of the earliest ranged weapons. Slingshots were only effective against un-armoured targets (Gabriel & Metz 1991, 75). They were probably used to fire volleys of shots to hamper the movements of an advancing enemy. The most effective ranged weapon is the bow. Bows are depicted in Palaeolithic rock-art (Rausing 1967, 32). Bows were fairly cheap weapons which were relatively easy to manufacture (McGuffie 1955, 737). When properly trained, an archer could deliver a direct hit over a long distance. Bowmen were probably used to fight from ambush positions and to harass and demoralise the enemy during combat. An archer's equipment consisted of at least a bow and arrows, but could also include a quiver, an implement for polishing arrows and a wrist-guard. Arrowheads are often retrieved archaeologically. A division can be made between arrowheads used for hunting, arrowheads used for war and arrowheads which were used symbolically. Some arrowheads were very thin or too heavy to be effectively used in combination with a bow, like those of the Breton-type from early Bronze Age Wessex (Mercer 2006, 129). These arrows probably had a symbolic or ritual function and were probably associated with hunting. They may also have been used to symbolically kill demons or evil spirits.

During the late Neolithic and early Bronze Age greater care was taken of the manufacturing of arrowheads. These arrowheads were specially crafted and were not only suited for hunting, but also for warfare (Butler & Fokkens 2005, 393). War-arrows were intended to stay inside of the target's body and should be hard to extract. Jagged edges and a triangular shape made it hard and painful for the arrow to be removed. Some arrowheads were deigned to break from the shaft when inside the body, making extraction harder and creating infections inside the wound. Poison could also be applied to arrows, like the venom of snakes or frogs. Keeley gives some examples, like the Mae Enga who attach a cassowary claw to their arrows which remains in the wound after extracting the main arrow. He also mentions the Dani who use barbed war arrows and the Meru and San who poison their arrows (Keeley 1996, 52). The wrist guard was intended to protect the wrist of the archer against the recoiling bow-string, which could cause injuries. A slate or bracer could be tied to the leather guard for decoration or to steady the hand. It has been thought that this bracer was the main feature which protected the wrist and was thus worn on the inside of the arm. This is probably not correct, since the bow-string would get caught behind the bracer this way which could inflict even heavier injuries (Butler & Fokkens 2005, 392).

With the absence of written evidence from prehistory, iconography is the closest 'documentary' source available, especially in the shape of rock paintings and petroglyphs. The use of the landscape, expressed through the alteration of this landscape and the

inclusion of architecture therein can be further indicators. Keeley argues that fortifications around prehistoric camps may be indications of violent conflict. Where arrowheads are located in large masses next to palisades and gates, these may indicate an archery attack. Keeley also mentions a single case in which an adult male skeleton with a flint arrowhead embedded in his back was found underneath a collapsed palisade. Finally, he sees burnt prehistoric camps as possible indications of violent conflict. With this evidence he tries to indicate that the widely accepted view of prehistoric enclosures and defence works as objects of symbolic expression may not always be right (Keeley 1996, 18).

Thorpe criticises this view and states that several prehistoric enclosures are used for burial and ritual deposition, while not showing any traces of a presumed defence or attack. Sometimes, there even are no traces of settlement found within such an enclosure. He mentions the sites Briar Hill, Etton, Haddenham and Windmill Hill as examples, of which the latter one is seen as "*...the most famous of all British causewayed enclosures*" (Thorpe 2005, 1). The only sites where the situation described by Keeley was found are Carn Brea, Crickley Hill and Hembury according to Thorpe. Thorpe further criticises Keeley's characterisation of these sites as "...a case of interpretative '*warrification*' (Thorpe 2005, 1). Anyhow, the existence of these sites showing the attack of the fortifications indicates that violent conflict did take place. At Crickley Hill in Gloucestershire, arrowheads were found around the burnt defence-works which might indicate a direct attack on the enclosure. An individual killed by stone arrowheads was found inside the Stepleton enclosure at Hamledon Hill in Dorset and a Neolithic man from Pormose in Denmark was found with a bone arrowhead in the nose and chest (Osgood & Monks 2000, 139). These are all indications of fortified sites at which people were killed violently.

Furthermore the building of defence works must indicate some sort of violence or danger against which the prehistoric people needed to protect themselves. They may have been used as sconces, defence works which were only used and inhabited when a threatening situation occurred. When an enemy appeared, the people could flee and secure themselves within the enclosure. This may also explain the absence of settlement within the enclosures. When there was no direct threat the people would live in a settlement outside of the enclosure. In these periods the enclosure could have been used for ritual and symbolic purposes. The usage of the enclosures can thus be interpreted in multiple ways.

By studying the main-indicators of warfare and violent conflict in prehistory discussed in this paragraph it becomes possible to study some actual cases, from the Palaeolithic up to the late Bronze Age. These main indications for warfare and violent conflict in prehistory are:

- Human remains and skeletal material
- Tools and artefacts, weapons
- Iconographic evidence, rock-art, petroglyphs
- Usage of the landscape, building of defence-works and enclosures

## 2. The rise of warfare: Traces of interpersonal violence during the Palaeo- and Mesolithic

According to Keeley, evidence of intra-specific, homicidal violence emerge with the first 'modern humans' (Keeley 1996, 37). Early traces of violence can already be found during the Palaeolithic. Recent DNA analysis suggests that *Homo erectus* ancestors were reduced in number dramatically some 500.000 years ago. It is believed that the cause is genocide (Thorpe 2005, 1). 'During the Lower and Middle Palaeolithic the main indicator of interpersonal conflict is skeletal material. Individual skeletons displaying traumatic injury inflicted by weapons or tools were found at Swanscombe in the United Kingdom, Ehfringsdorf in Germany, Fontéchevade in France and Broken Hill in Zambia (Thorpe 2005, 6). Twenty-seven human skeletons were found at Sima de los Huesos in Spain, dated to 350.000 BC.. The skulls of these individuals showed traces of healed impact fractures. Similar trauma to the skull was observed at Ngadong, Java, where eleven skulls with trauma were discovered and in Choukoutien in China where fourteen *Homo erectus* skeletons were found with fractures and depressions in the cranium (Thorpe 2005, 7). In Grimaldi, Italy, an *Aurignacian* child was found with a broken spear tip embedded in the spinal column (Keeley 1996, 37). Fifty-nine late-Palaeolithic burials, of which twenty-four had stone arrowheads embedded in the bones, were found at Jebel Sahaba in Sudan and were dated to 13.500 BC (Thorpe 2005, 8 ; Keeley 1996, 37).In the Nile Valley a male burial with a stone projectile point in the abdominal region was found, dated to the Upper Palaeolithic (Keeley 1996, 37). According to Thorpe the bow and arrow were first used in the late-Palaeolithic, around 20.000 BC (Thorpe 2005, 8).

Traces of interpersonal violence during the Palaeolithic can most notably be observed among Neanderthals. Although Neanderthals genetically are seen as a specific genus other than *Homo sapiens sapiens*, they do display similar ways of behavioural patterns in handling tools for aggressive and co-operative purposes (Zollikofer et al. 2002, 6448).

Neanderthal bones often show signs of violence in the shape of healed fractures or wounds inflicted by weaponry or sharp objects. Six skeletons of Neanderthal adults were found by Ralph Solecki in 1957 and 1960 in the Shanidar Cave, located in the Zagros mountains of northern Iraq (Stewart 1977, 121). Four of the skeletons displayed traces of severe trauma (Trinkaus 1978, 142). Neanderthals number I and III had sustained severe trauma during their life which may be ascribed to violent actions (Stewart 1977, 164). It was noticed that one of the Neanderthals had received many injuries on the upper part of his body. Scars were visible on the skull and the lateral side of the left orbit had been crushed. Furthermore, twenty-nine bones of the right arm were missing from the deposit and there were no signs of post-depositional removal. This may indicate that the arm was already lost during life and not post-mortem (Stewart 1977, 128). The scars on the skull seem to have been minor surface injuries, maybe scalp cuts (Trinkaus 1978, 143). The skeleton of Neanderthal number III displayed partially healed trauma to the left ninth rib, which may have been inflicted by a sharp object. This may have been an accidentally inflicted wound, but the angle of the incision and the clean cut implied that this was a stab-wound (Trinkaus 1978, 143). These signs of inflicted trauma may indicate that intra-specific violence was a known issue to the Shanidar Neanderthals. Five of the Neanderthals seem to have died around the age of forty. According to Stewart, this supports the view that violence was part of Neanderthal life at Shanidar Cave (Stewart 1977, 164).

Other signs of inflicted wounds have been found on several young Neanderthals and an adult female, who was wounded on her upper right arm at La Quina in France. Another injury to the forehead, which could also be observed with Shanidar Neanderthal I, was observed on a young adult Neanderthal skeleton from Sala, Chechoslovakia (Trinkaus 1978, 145). Another Neanderthal skull showing traces of deliberately inflicted injuries was found at St. Césaire in France. Scars indicating a partially healed ‘slash’ on the skull were visible, indicating a powerful blow to the head which damaged the cranial vault (Zollikofer et al. 2002, 6445). It was concluded that this injury was caused by using a tool during an act of intra-group, inter-personal violence (Zollikofer et al. 2002, 6448). More known cases of Neanderthal skeletons showing trauma that can be caused by violent conflict come from Kebara and Tabun in Palestine, La Chapelle-aux-Saints and La Ferrassie in France and Krapina in Croatia (Thorpe 2005, 7). Zollikofer et al. suggest that the evolution of cognitive and behavioural abilities to use tools during violent conflict was already present during early hominid evolution. They further assume that there was no major ‘transition’ between Neanderthal-specific to early modern human-specific behavioural patterns during the Upper Palaeolithic (Zollikofer 6448). This may be true on

the level of social tool use during conflict, although this vision is not unequivocally applicable on every level of behavioural transition between Neanderthals and early modern humans.

The Mesolithic saw the intensification of violent conflict and probably the introduction of weaponry on a larger scale, including the bow, sling, dagger/knife and mace (Van der Dennen 1995, 211). The earliest clear evidence for the use of bows in central Europe was attested by the discovery of arrowheads at the site of Stellmoor in Germany , dated to 8500 BC (Rausing 1967, 33). Sixty-five skeletons were discovered at Schela Cladovei in the Iron Gates area along the Danube river, of which six individuals sustained projectile injuries and others contained traces of cranial injuries. One third of the discovered skeletons had suffered traumatic injury (Thorpe 2005, 10). Projectile injuries were also founds among several sites in The Ukraine. At the Ofnet cave in Bavaria, Germany, pits were discovered containing the skulls and vertebrae of thirty-eight individuals, stained with red ochre. At least half of the individuals had sustained injuries inflicted by blunt, mace-like weapons (Thorpe 2005, 10). The large scale of this burial may indicate a massacre in which an entire population was wiped out, followed by the taking of trophy-skulls (Thorpe 2005, 10 ; Keeley 1996, 102). Similar injuries inflicted by blunt weapons were observed on the remains of a man, woman and a young child discovered at Hohlenstein-Stadel. Cut-marks at the base of the skulls indicate that the skulls were probably decapitated. Skeletons with healed fractures were found at Téviec and Hoedic along the coast of Brittany, France. One of the skeletons had two flint arrowheads embedded in the spine. (Thorpe 2005, 11).

Based on the current evidence, the level of conflict seemed to be particularly high in Scandinavia. At Bäckaskog and Stora Bjärs in Sweden skeletons with bone points in their chest cavity were discovered. A skeleton with a similar injury was found at the site of Skateholm II and a skeleton with and arrowhead embedded in the pelvic bone was discovered at Skateholm I. A child of approximately ten years old was found at Tägerup with an arrowhead with a broken tip embedded in the hip-bone. In Denmark a body was found with a bone point in the throat at Vedbaek. Two other individuals among which one child were buried along with the individual, suggesting a sudden and violent death. The bodies of nine individuals with cut-marks reaching to the marrow inside the long bones were found at Dryholmen, Jutland (Thorpe 2005, 11).

## 3. The Neolithic: Conflict in Europe

An intensification of social conflicts can be observed towards the end of the Mesolithic period. During the Neolithic these conflicts possibly intensified due to an increased sense of territoriality among human population, which was partially caused by sedentism (Louwe Kooijmans 2005(b), 196). Violent deaths can still be observed at cemeteries, where human skeletal remains are often found with arrowheads embedded in their body. Some of these individuals may however have died by a hunting accident (Louwe Kooijmans 2005(b), 196). The archaeological evidence for this period is not based on skeletal material and artefacts alone, but also on architectural and iconographic evidence. Fortifications are introduced and depictions of violence appear in rock-art. One of the earliest depictions of Neolithic warfare can be observed in the rock art of Arnhem Land, located in the Northern Territories of Australia. The rock-art can be dated to approximately 8000 BC. and shows two armed individuals fighting each other. Depictions of men throwing spears at each other can also be observed in Arnhem Land, dating to approximately 4000 BC. (Van der Dennen 1995, 211; Thorpe 2005, 9). Levantine rock art from Spain also depicts combat scenes, like the scene known from Morella la Villa, in which two groups of individuals are shooting at each other. The Spanish rock-art has been dated to the Mesolithic for a long time, but it actually should be dated to the Neolithic according to Fairén (Thorpe 2005, 6 ; Fairén 2004, 6-7).

The weapons in these depictions are often found in men's graves from the Neolithic. These graves often held adzes, bows and arrows. These axe or adze could have been associated with woodworking and tree-felling, while the bow and arrow were associated with hunting, but both kinds of weapons were probably also associated with fighting (Gijn & Louwe Kooijmans 2005, 223-225). Keeley exemplifies this vision by describing the Mae Enga men from New Guinea, who always carry their axe with them in their belt to be prepared for unforeseen fights and violence (Keeley1996, 50). Bows have been found at several sites like Burgächisee near Seeberg, Switzerland, Satrupermoor in Germany, Onstwedde and Noordwijkerhout in the Netherlands and at Meare Heath and Aschott Heath in England (Rausing 1967, 38, 43-44).

The archaeological record shows that territoriality and an increased sense of regionalism came to a peak in the Linear Band Ceramics (LBK) period. Enclosures, sometimes with v-shaped ditches, were built around houses and settlements. Their function is still a subject of debate, as was illustrated earlier in this chapter. Traces of violence become very apparent during the LBK Period and mass killings seem to have taken place at various sites, like Schletz and Roaix (Keeley 1996, 38; Orschiedt et al. 2003, 376;

Gronenborn 2006, 18). At Schletz in lower-Austria, a large number of people had been massacred and the bodies were thrown into the moat surrounding the village. Their crania showed traces of traumatic injury and post-mortem gnawing marks were visible on the bones, indicating that the bodies had been lying in the open for some time (Gronenborn 2006, 18). The classical and best known example of a large scale massacre during the LBK Period is the site of Talheim. The remains of thirty-four individuals from approximately 5000 BC. were found here in a mass grave. Eighteen of them had been killed by the strike of a blunt weapon, probably an axe or adze, to the back of the cranium (Gronenborn 2006, 17). Others had been shot with arrows, which also seem to have struck the victims from behind (Gronenborn 2006, 18). Graves like these also appear elsewhere in the LBK world, in which the arrowheads do not appear to be grave goods, but are probably the cause of death. Out of the one-hundred and thirteen graves at Elsloo in the Netherlands, two female and three male individuals may have been killed by arrows (Van Gijn & Louwe Kooijmans 2005, 233).

Another interesting site is Herxheim near Landau in the German Rheinland, where excavations started in 1996. More than four-hundred and fifty individuals were found in ditches around the enclosure, mainly represented by skullcaps. They were placed in the ditches systematically (Orschiedt et al. 2003, 377). After re-examination these ditches turned out to not be a single structure, but they consisted of overlapping long pits (Orschiedt & Haidle 2006, 163). Many skulls showed signs of post-mortem manipulation (Orschiedt & Haidle 2006, 159). The skulls were split symmetrically and the calottes had been severed. Cut-marks were visible and were probably inflicted when removing the skin and cutting the mandible attachment. Post-cranial skeletal remains were often smashed. The spiral fractures in the bones indicated that they were broken when they were still fresh (Orschiedt & Haidle 2006, 160). The facial bones were removed by well aimed blows to the front of the skull (Orschiedt & Haidle 2006, 377). Other finds comprised of two-hundred burials of *Canis familiaris*, purposely destroyed bone artefacts, animal and human tooth pendants and a fragmentary human figurine made out of clay (Orschiedt & Haidle 2006, 164). Twenty-three halve mandibles of small carnivores stained with redo ochre were also found (Orschiedt & Haidle 2006, 163).

The Talheim massacre can be interpreted in multiple ways. The people there may have been killed during a raid as part of a conflict or as an effect of genocide. They may also have been executed as punishment or they were ritually murdered. The presence of enclosures does however seem to indicate a threat from the outside and probably systematic warfare among groups of people instead of merely individuals. Fortified settlements at the edge of the former LBK world may have built as a reaction to a hostile

outside world (Van Gijn & Louwe Kooijmans 2005, 233). An LBK enclosure site in the United Kingdom is located at Mount Pleasant in Dorset (Mercer 2006, 131). Building these enclosures without being threatened from the outside would take unnecessary effort and it seems useless. Modern tribal communities do not build defences, since raiding and fighting pre-arranged mock battles define their vision of warfare (Louwe Kooijmans 2005 (a), 461). The Herxheim enclosure however seems to have had a ritual character. Since the enclosure here was not a unified structure, it probably did not function as fortification. The human remains were deposited at Herxheim over a period of fifty years and were buried there individually or in groups. It probably had a ritual purpose and was used as a necropolis during the late LBK period (Orschiedt & Haidle 2006, 163-165). The deceased may still be victims of warfare, but this theory cannot be further supported and is just based on assumption.

A relatively quick and abrupt transition can be observed from the LBK to the Grossgartach culture. The threat of armed conflicts in this period is attested by the enduring presence of enclosures and fortifications from the LBK onwards (Louwe Kooijmans 2005(c), 256). Defensive enclosures further appeared during the Michelsberg expansion, like the one at Bruchsal-Aue, Klingenberg and the Hetzenberg enclosure at Heilbronn, where several burial with traumatic injuries were discovered (Gronenborn 2006, 21-22, 26). If these causewayed enclosures were indeed built for defensive purposes they might imply an increase in the scale of armed conflicts. More possibly fortified sites including finds of battle-axes were found in the Lower Rhine Bassin (Louwe Kooijmans 2005(c), 257). At Ilsfeld, also near Heilbronn, the body of an adult male was found in the moat with a widened *foramen magnum*, which may indicate that the body was skewered on top of a post. Other skeletons with traumatic injuries to the cranium were found at Heidelberg-Handshuhsheim (Gronenborn 2006, 23). Skeletons with severe traumatic injuries were found in moats at Altheim, a site from the late Michelsberg-period, and were associated with a high number of arrowheads (Gronenborn 2006, 26).

## 4. The Bronze Age

With the coming of the Bronze and Iron Ages, especially in the Near East, organised state-level warfare is introduced. Wars erupted between the city-states of Sumer around 3000-2500 BCE (Saul 2009, 16). The wars which followed were fought with increasingly specialised weaponry and equipment, as was partially described in paragraph 3. For Europe it has long been thought that the Bronze Age was a period of relative peace and stability in which trade flourished and peaceful contacts were made between the peoples that inhabited the area which is currently known as Europe. Archaeological evidence however contradicts this vision. Defences were erected throughout the landscape and weapons were specifically designed for fighting. Weapons reflected status and warriors were probably commemorated after death in iconographical depictions (Monks & Osgood 2000, 7). For the Bronze Age, the main archaeological evidence is again represented by human remains, fortifications, weaponry and iconography.

Inhumations were often placed under barrows or the body was placed inside a log coffin in the earlier phases of the Bronze Age, while cremation became more common during later phases. A crouched male inhumation with barbed and tangled arrowheads located near the spine was discovered at Barrow Hills in Oxfordshire. An impact fracture is visible on the tip of one of the arrowheads and both barbs are broken off. This arrowhead may have killed the individual in this grave. Another possible archery victim was found at Stonehenge in Wiltshire. This burial was accompanied by an archer's wrist guard. A small fragment was found in the individual's meso-sternum and a flint arrowhead tip was lodged in the left-hand rib. Another flint arrowhead was embedded in the sternum. The latter arrow probably hit its victim in the back, piercing the heart and hitting the sternum. The angle of the arrowhead and the point of impact suggest that the arrow was fired at a fairly short range. At Hogeloon in the Netherlands a flint arrowhead was found inside cremated remains which probably should be dated to the Bronze Age. It may have been present inside the body of the cremated individual and was therefore not completely destroyed by the fire, expect for the base of the tip (Monks & Osgood 2000, 19-20; Thrane 2006, 494).

A mass grave was found at Sund in Norway. Seven individuals were inside the grave showing signs of trauma. Their ages ranged from approximately 17 to an age of 40 years. One of them was male, another one female and for the other five individuals it was impossible to verify a sex. Two of them have healed cuts, probably inflicted by a metal blade. Individual number II had received an unclean cut to the humerus, which may have cut through a shield since it is very shallow and not straight. Individual IV was also

injured by a metal blade and was probably stabbed through the abdomen which had damaged the vertebrae without healing. Individual VII contained the most traces of trauma. An unhealed cut inflicted by a sharp and pointed object was visible on the neck of the left femur. The os sacrum had been dislocated which may indicate that this person was kicked or hit in the back, probably with a blunt object (Fyllingen 2006, 324-325).

A 50-60 year old male with a bronze spearhead embedded in the pubis was found at Vindinge in Denmark. The wound had healed, so the person was not killed by the spearhead. At West Littleton Down in Gloucestershire another individual was found with a bronze spearhead in his vertebrae. Another tip was embedded in the pelvis and the skull had been damaged. Another individual found at this site was found with an arrowhead in his side (Monks & Osgood 2000, 21). Traces for inter-personal violence have been discovered at Wassenaar in the Netherlands, where twelve individuals were buried simultaneously around 1700 B.C.. One of these individuals, number ten, had a flint arrowhead embedded in the chest. Individual number two showed gashes in the lower jaw and number three had gashes in the right upper arm. The skull of individual number five also showed traces of traumatic injury. The predominating number of able-bodied men in this communal burial suggests that some sort of conflict took place in which these casualties were made (Louwe Kooijmans 2005 (a), 461).

Fortifications have been absent in the Netherlands, but they have been found at sites like Grimspound in Dartmoor. This site had an enclosure wall, just like the sites of Merrivale and Shaugh Moor (Monks & Osgood 2000, 10). Hilltop sites with indications of defensive fortifications dated to the Middle Bronze Age were found at Norton Fitzwarren in Somersat and Rams Hill in Berkshire (Monks & Osgood 2000, 11-12) The degree of fortification intensified in England during the Late Bronze Age. These fortified sites may have been used to protect trade routes, since they were located near important passageways. They may also have been used as a base from which to protect smaller settlements or they may have been clearly demarcated independent settlements (Monks & Osgood 2000, 14).

The evolution of weapons is one of the most interesting development in the Bronze Age. Bronze Age weapons were often not usable as hunting weapons, but were most probably specifically designed for killing humans. Five types of weapons can be observed to have been in use during the Bronze Age: daggers, swords, bow and arrows, axes and spears (Thrane 2006, 493). The previous chapter shows that bow and arrow were commonly used as weapons during the Neolithic and this tradition of archery carried on into the Early Bronze Age. Bone arrowheads from the coasts of the Baltic Sea were studied by

Heidi Luik, who concluded that some of these arrowheads were specifically made for warfare. The arrowheads were dated to the Late Bronze Age, around 1100-500 BC (Luik 2006, 132). Most of them had a typically hooked tang and they were designed to detach from the arrow-shaft when trying to remove the arrow, leaving the arrowhead behind inside the body. This would immobilise the enemy and create a nasty wound which would easily get infected, making these arrowheads ideal for warfare. Shorter arrows with a wider blade would have been more suitable for hunting, since they would cause heavy bleeding and were easier to extract (Luik 2006, 142). Heavy bleeding and pain would also immobilise an animal, but also leave a blood-trail to follow once the animal was shot. Bows have been found in Europe at sites like Edington Burtle in England (Rausing 1967, 52).

Metal daggers were also manufactured and were probably carried by archers as means of self-defence. Shields were also used during the early Bronze Age as is attested by a wooden shield-former which was used as a mould for manufacturing leather shields found at Kilmahamogue in Ireland. The shield-former was dated to 1950-1540 BC (Monks & Osgood 2000, 141). Metal spearheads appear from the end of the Early Bronze Age onwards (Monks & Osgood 2000, 25). Separate spearheads were designed for thrusting, throwing or for both purposes (Thrane 2006, 494). Axes were also used in the Early Bronze Age, next to the halberd (Thrane 2006, 505). Ben Roberts and Barbara Ottaway studied the use-wear on Late Bronze Age socket-axes from south-eastern Scotland and eastern Yorkshire. Two axes from Scotland contained possible impact nicks which could be ascribed to impacts on metal, indicating possible combat (Roberts & Ottaway 2003, 132). Only a single experiment had been carried out on metal wear of a socketed axe before (Roberts & Ottaway 2003, 132; Bridgford 2000, 154). Clubs and weapons made of organic materials may also have been used, but were not preserved in the archaeological record.

Swords and rapiers appear during the Middle and Late Bronze Age. Some of these swords were t large and heavy to wield.. Weapons like these and metal artefacts were often deposited in swamps in the Low Countries like The Netherlands and Belgium, which has led to the belief that they had a ritual function (Fokkens & Butler 2005, 384). Mercer states that not all of these weapons have to be deposited there purposely. Weapons could also have been lost when fighting near the water, which was likely to mark a natural boundary. They could also have been lost when attempting a raid across water (Mercer 2006, 137). The heavy swords, often solid-hilted *Volgriffschwerter* also lack the amount of damage that can be observed on other, less heavy sword types (Thrane 2006, 507). This further indicates that they were not used in combat.

It is often stated that Bronze Age swords were unsuited for actual combat and that warfare with swords was therefore a ritual activity (Kristiansen 2002, 319). Many Bronze Age swords have been replicated and tested by Kristian Kristiansen, who came to the conclusion that many of the swords were in fact functional (Kristiansen 2002, 320). He studied the morphology of the blades and hilts of the swords and the use-wear and damage which has been dealt to the blade (Thrane 2006, 495). Damage by both offensive actions and defensive actions can be observed this way. The blade area below the hilt was used by the swordfighter when defending against another sword. Kristiansen observed that the blade was altered here, being narrower than the rest of the blade with traces of damage often being heavier on one side of the blade (Kristiansen 2002, 323). This indicates that the sword was often held in the same position, taking damage while defending to the side generally facing the enemy. The middle part of the sword was used when attacking in a slashing movement in which the blade would collide with another weapon. Traces of damage and re-sharpening can also be observed here. The tip of the sword could have been damaged while thrusting the sword into an enemy shield, which would make it necessary to re-sharpen the tip. Swords with damage inflicted by attacking and thrusting can commonly be ascribed to the Middle and Late Bronze Age, which according to Kristiansen indicates the generalises nature of sword-fighting in these periods (Kristiansen 2002, 323).

Shields further evolved during the Middle and Late Bronze Age and were now made of organic materials as well as metal. A Bronze shield with possible battle-damage was found at Long Wittenham in Oxfordshire (Monks & Osgood 2000, 26). Beautifully crafted body armour, like helmets, greaves and cuirasses were also manufactured. They were generally made out of thin sheets of Bronze which would not make them unsuited for combat. Kristiansen however remarks that an inside padding of soft and protective material would have made these armours better suitable for fighting. It is however more likely that these pieces of armour had a ceremonial function and were not used in close combat. The Vikso-helmets from Denmark look very impressive with their large curved horned and a beaked face mounted on it. The helmets are however too heavy to have been actually worn when fighting (Monks & Osgood 2000, 28). Another possible explanation is that they may have been worn by a commander or chief to have a psychological effect on the enemy in battle.

Iconography form the Bronze Age gives information about the armour and weapons being worn by people. Shields are depicted as being used with all kinds of weapons except for bows. Horses and possible chariots are also depicted in iconography and there is a possible depiction of swords with a chape attached to the scabbard at Kville Hundred in Sweden. This would associate them to mounted troops (Monks & Osgood 2000, 30). Iconographical depictions from the Aegean area give a good insight in how weapons were used. The Sherden were an ethnic group which belonged to the Sea Peoples confederation which invaded Egypt during the end of the Bronze Age around 1200 BC in the Mediterranean area. Warfare was more advanced here in this period. The Sherden are depicted on the walls of the temple of Medinet Habu, the funerary temple of Ramses III in Luxor. They are depicted wielding specialised swords which were manufactured as the result of new ways of metalworking (Gonen 1977, 31). The Sherden were among the first to use these new rapier-like blades, which probably makes them the first professional swordfighters in history (Anglim 2002, 12).

The archaeological evidence for the Bronze Age clearly shows that the Bronze Age was no 'golden age' of peace and prosperity. Traces of violence and combat can be found around the Bronze Age world and a rapid evolution of weaponry took place. Trade was important for the Bronze Age societies and the raiding of trade-routes would be an obvious result of the rise of large-scale trade networks. Fortifications overlooking these trade-routes were therefore needed. The main cause of conflict in the Bronze Age thus seems to have been competition over trade and tradable goods (Monks & Osgood 2000, 147). Bronze age societies had enough wealth and social organisation to make warfare possible (Thrane 2006, 492). Based on the deposition of weapons and the burial of weapons in high-status graves indicates that warriors had an important role in the Bronze Age world. While the Bronze Age saw the rise of organised warfare in the Mediterranean and the Near East, the European Bronze Age may also be seen as a prelude to organised warfare arising in the Iron Age.

## 5. Conclusion

Before actually studying conflict and warfare in the past it is important to first recognise and understand the earliest forms of armed conflict which are known, including the main ideas behind conflict and warfare. In short: "When and why did people first kill each other in violent conflict?" This chapter was meant to illustrate the origins of human violence and aggression and give an indication of the evolution of violent conflict up to the rise of organised warfare at the end of the Bronze Age. It should now be clear that primates have tendency to show aggressive behaviour, a trait that is also present with

*Homo Sapiens sapiens* and his ancestors. Military history has often placed the beginnings of war at the first conflicts recorded in writing in the Near East, but violent conflict has been present among the earliest modern humans as is attested by the archaeological examples discussed in this chapter. By studying human remains, weapons, iconographic evidence and the landscape, archaeology provides a view into the earliest possible forms of armed conflict.

From the Palaeolithic onward, human beings have killed each other for various reasons. By studying human psychology and social anthropology many reasons can be given why violent conflict is part of human nature and why this tendency of violence is present from the early beginnings of mankind up to the present day. Several anthropological theories were only very briefly discussed to give an insight into the vast amount of thought that lies behind human violence and it is impossible to discuss all different theories in one book or one single thesis. They were only meant to illustrate that the origins of warfare and violent conflict lie with the origins of mankind. The archaeological evidence does not directly indicate organised warfare, but it does show that people killed each other in violent confrontations, which were paired with scalping, mutilation, possible trophy-taking and other acts of violent aggression. These conflicts are often referred to as 'primitive warfare' in comparison to the 'civilised' war as we know it since the wars of the Sumerian city states in the Near East and the Roman period in Europe. Perhaps 'primitive' is not the right word here and should be replaced by 'unorganised' or 'pre-state' warfare.

The Mesolithic possibly saw the rise of the first weapons revolution, the introduction of weapons which were used in inter-personal conflicts, which were later applied during the intensifying conflicts of the Neolithic and the Bronze Age. The Bronze Age can finally be seen as the period in which organised warfare started to develop. Weapons changed over time from weapons suited for hunting and combat to weapons which were specifically designed to kill or inflict trauma to other humans. The latter development especially took place during the Bronze Age and the Iron Age, in which the sword became a common weapon. The sword and later the sabre were used up to the rise of the modern firearms, still being used well into the late 18$^{th}$ century and the early 19$^{th}$ century. The bow and arrow, spear and axe all went through an evolution after prehistory, seeing combat throughout the Medieval period and the Renaissance.

Hopefully it is clear now that the theory of the noble savage as it was posed by Rousseau is indeed a myth. Human societies desire peace, but Aristotle already said that "*We must make war so that we can live in peace.*" For some societies peace even can be too costly.

Humans are violent creatures with the cognitive abilities to understand cruelty, to design weaponry and to plan and direct their aggression in order to achieve their individual or common goals. On the other hand, humans also possess the cognitive abilities which allow them to understand their own actions and to understand that warfare is a cruel business. War brings out the best and worst in people and it incites the strongest emotions that are known to people. It gives rise to feelings of aversion as well as being a source of fascination. Robert E. Lee (1807-1870) already said that: "*It is well that war is so terrible, or we should grow too fond of it*." War and violent conflict will always be part of human behaviour and therefore it needs to be studied thoroughly so that we may learn from the past in order to understand our own actions in the present. Plato was right when he said that "*Only the dead have seen the end of war."* And the archaeologists will be there to tell the tales of the dead which remain untold by the annals of history.

## Appendix B: Trauma Types

### 1. Sharp Force Trauma: Trauma Inflicted by Bladed Weapons

The sword and other bladed weapons have been the main armament of warriors and foot-soldiers from the Bronze Age up to the 18th century, when the blade was replaced by the firearm. Swords have been sporadically used in later periods and they are still being used as ceremonial armament. Swords were still the weapon of choice for cavalry units in the 19th century. Daggers, knives and bayonets have however been used up to the present day. All these weapons are capable of inflicting sharp-force trauma, since they are all designed to have sharp edges and a sharp point. Sharp-force trauma may be inflicted in ante- or perimortem situations, but it may also be caused by post-mortem dismemberment, destruction and mutilation of a body.

Bladed weapons can be used for cutting, chopping and stabbing. Stab-wounds can be seen as a form of blunt trauma, since the impact of the weapon is stopped by the bone, turning the weapon into a blunt object which forces its way through the bone. (Symes et al., 407). Cut-wounds can be identified easier. Their length is generally greater than the depth of the incision. They are scraping wounds which often terminate in a tension-compression fracture and leave nicks, gouges or punctures. (Symes et al 406-407). The cuts are often linear, but the blade may have bumped off the hard surface of the bone, leaving a trail of small cuts where the weapon skipped across the bone surface. The cut-marks often have one well-defined and clean edge and one rough ones with parallel scratch marks and damage around the mark (Wenham 1989, 127). Cuts with bladed weapons consist of several parts: the surface around the cut-mark, a smooth kerf-wall where the blade cut into the bone, a rough kerf-wall opposite the smooth wall and the so-called floor of the cut-mark. Due to the impact of the weapon, the surface around the cut may display small fractures and damage.

The cut-marks have several traits which can be recorded and studied: Cut-mark length, cut-mark shape, cut-mark depth, feathering (‘jumping’ of the blade), flaking, fragmentation of bone (fractures), breaking of bone, angle of entrance, orientation of cut-mark on the body, colouration of the cut and healing of the bone. Different types of bladed weapons leave different kinds of cut-marks. They can often be roughly identified in the field by macroscopic analysis. Swords usually produce deep and wide marks, often V-shaped or U-shaped when the sword was unsharpened, with extensive damage caused around the cut-mark itself. Knives however inflict shallow and narrow cuts, often with meandering kerfs and little damage around the cut-mark. Knife-cuts are always V-shaped. (Lewis 2008, 2004-2005). Sword-cut marks are often longer than knife-cut marks.

Chopping motions with a sword leave short marks as well, but there will be more damage to the sides of the cut and the cut itself will often be deeper than a cut inflicted with a knife. Some cut-marks can be diagnostic and can thus be used to identify the type of weapon which inflicted the trauma. Individual 25 found at the Towton battlefield showed traces of a large blade wound across the back of the head, as well as a straight cut through the front of the face, almost bisecting the head (Novak 2010, 101).

Cut-marks are generally present on the forearms and the head. The head was often the main target, since cranial trauma or the severing of the arteries and nerves in the neck are very lethal. Cuts on the arms were inflicted during combat, often to the arm which held the weapon, but also to the off-hand, unless the individual was wearing a shield. Cut-marks on the body are observed less frequently. Cuts to the body are less efficient. The torso and pelvis were often attacked by stabbing in order to penetrate the internal and vital organs. Body armour was generally worn over the torso, which would also make it a less favourable target. By looking at the smooth edge and the angle of the walls of the cut-mark the orientation in which the weapon entered the bone can be reconstructed. When damage is primarily dealt to the left side of the individual's body this may indicate that the attacker was right-handed and vice-versa. Swordsmen around the world and throughout time have generally been right-handed. Traces of healing may indicate that the trauma is ante-mortem and that it was not the cause of death. It will then be either a peri- or post-mortem wound. Colouration of the cut-mark will help to identify if the cut was not recently made by a shovel or trowel.

A special type of blade weapon is the bayonet, which can be used both as a pole-arm and a bladed weapon. The most efficient way to kill with a bayonet is to target the throat (Karlsson 1998, 30). Bayonets were also used to target the torso, but this might result in the bayonet getting stuck in the body or breaking off, which would not as easily happen when stabbing in the neck (Hodges 2008, 125-126). When actually used as a stabbing weapon, the chance of hitting a bone is quite large. In an article by Rose the damage of a bayonet-wound to the *tibia* is shown in an illustration (Rose et al. 1988, 108). The bayonet has only chipped a piece from the bone and has created a small fracture. If this wound had been inflicted on the battlefield, it would certainly have been painful, but not very effective. When hitting the bone the bayonet might have easily broken off. A broken bayonet may have become lodged in the body, making it possible to enter the archaeological record together with the body. The cutting edge could be used to inflict cuts to limbs. The bayonet was probably used to kill enemies who were already wounded and lying on the floor, a practice which was common during the 18$^{th}$ century.

Its exact origins are unknown, but the bayonet seems to have been used since the 16th and it was certainly used in the 17th century. The earliest bayonets were plugged into the barrel of a musket, making firing impossible, but during the 17th century they were replaced by ring- bayonets and in the 18th century they had been fully replaced by the socket-bayonet. The use of the bayonet has decreased in the 19th century. During the American Civil War its use had become far less common than a hundred years earlier (O'Connell 1992). Engen claims that the bayonet in modern warfare is used as a strategic and inspiring tool and not as a functional weapon anymore (Engen 2006, 2). However, the US Marines and the army of the United Kingdom are supplied with functional bayonets for close quarters combat in the current conflicts in Iraq and Afghanistan. Bayonets are also used in training to make soldiers more aggressive.

Saw-marks, another indication of sharp-force trauma, may have been left when traumatic amputation of a limb took place or when a body was cut for transportation or when it was mutilated purposely out of disrespect or to make it unidentifiable. Saws generally leave a square cut, since the saw does not directly cut the bone, but shaves it. False starts should also be visible on the kerf-floor. The type of saw which was used can sometimes be identified by studying the number of teeth per inc visible in the kerf. Wall *striae* may further be used to identify the shape of the blade. Traces of amputation are rare in the archaeological record (Roberts & Manchester 1999, 90). They can however be encountered, as was the case with an individual found in a common grave related to the massacre of Fort William Henry in 1757 (Liston & Baker 1996, 29).

The current knowledge about the effect of bladed weapons on human remains from the archaeological record is greatly based on experimental archaeology and the involvement of specialists. Several experimental test have been undertaken with bladed weapons and have provided interesting conclusions. Specialisation with the weaponry which is discussed, as well as proper study of the time in which a conflict took place is essential. By studying sharp-force trauma the conflict archaeologist can establish the possible cause of death of the victim, the weapon type which was used, the direction from which the victim was hit, the attack pattern and the stance of the attacker (standing, kneeling, mounted), the possible main hand in which the attacker held his or her weapon, the possible wearing of armour and the post-mortem treatment of the body.

## 2. Blunt -force trauma

Next to sharp-force trauma, the most common type of combat-inflicted trauma seems to be blunt-force trauma, characterised by depressions and large holes in the human bone, accompanied by fractured and broken bone-material. The edges of the wound are often splintered (Roberts & Manchester 1999, 82). Blunt trauma can be administered with many objects and weapons, from a simple stick or rock to a club or the butt of a musket. Before the advent of metalworking blunt weapons like stone axes were mainly used in combat as has been illustrated with some examples in chapter 1 (Thorpe 2005, 10; Gronenborn 2006, 17). Axes often have a sharp edge, but instead of cutting or penetrating they are mainly constructed to inflict blunt-trauma. The sharpened blade of the axe often creates a depression but it may penetrate the bone as well, driving pieces of bone into the wound in the direction of the blow (Wenham 1989, 133).Light blows will often result in linear fractures (Loe 2009 267). Depending on the force of the blow concentric or radiating fractures will be visible around the wound, but comminuted fractures are also a possibility (Boylston 2002, 361).

Blunt-force trauma can often easily be distinguished from sharp-force trauma, since it is radically different from the incised cuts left by bladed weapons. Determining the weapon which was used to administer the blunt-force trauma is often difficult. The size of the wound may give indications about the size of the weapon and the force with which the weapon hit the body. Complex fractures and comminuted fractures may indicate that substantial power was used by the wielder of the weapon. Sometimes the shape of the weapon is still visible in the bone, since it forced its way through the tissue, leaving behind the outline of the weapon's edges. An oval-shaped axe may thus leave an oval depression or hole in the bone. This makes it possible to identify the type of weapon which inflicted the trauma. A good practical example is the square mark in the skull of individual Towton 9 found at the Towton battlefield, possibly inflicted by a war-hammer. Another wound in the head of individual 41 mimicked this wound, but it has been inflicted using the top-spike of a pole-arm (Novak 2010, 99).

**3. Projectile and Bullet Trauma:**

Trauma inflicted by bullets or ballistic wounds belongs to the domain of wound ballistics. Wound ballistics is the study of terminal ballistics of projectiles and bullets which penetrate human tissue (Bellamy & Zajtchuk 1990, 108). The nature of the wound is determined by the characteristics of the bullet or projectile (construction, shape and mass) as well as the characteristics of the targeted tissue (Fackler 1996, 195; Hollerman et al. 1990, 685). Since soft tissues have often decomposed, most human bodies in the archaeological record do not carry visible traces of a bullet impact unless the projectile collided with a bone or when its impact affected bones nearby. Projectiles often puncture or perforate the human body, causing penetrating trauma.

When the projectile actually penetrates the body it leaves an entrance wound. When it comes back out again i.e. perforating the body, it also leaves an exit-wound. In most archaeological cases the human body has already decomposed. The wounding pattern to soft tissues will thus no longer be visible and the entrance and exit-wounds can only be observed in bone. The best indication for projectile trauma however is the projectile itself which can be found with the human body or inside it. As was illustrated in chapter 1 arrowheads and spear-points can get stuck or break off in the human bone, being preserved inside the body. When found in close proximity with the body and when displaying traces of impact, the projectile probably impacted on the body. When arrowheads for example were lodged only in the flesh of an individual they will have been released from the body during decomposition. They can however still be found together with the body. The arrowheads may have still hit a bone, leaving marks on the bone surface. Individual 40 found at the Towton battlefield displayed penetration-trauma left by an armoured-piercing arrowhead (Novak 2010, 98).

Before the invention of the firearm the most commonly used ranged weapons were the bow and the spear or javelin. Other projectile weapons include specialised ranged weapons like *boleadoras, shuriken,* the *atl-atl* spearthrower, blowpipes, slingshots and other types of weaponry. The best indication for trauma inflicted by bowmen is the presence of actual arrowheads in close relation to a human body, especially when the arrowhead is still embedded in the bone.

The arrowhead's orientation often seems to indicate an attack from above. This is not strange, since arrows are often fired in an arc to increase the range of the arrow, hitting the target from above. Shots with a flat trajectory are however possible. Arrows may also have been fired at extremely short range, possibly as method of execution. When the target was already lying on the floor or when it was standing in an elevate the position the arrowhead may have come from below with its point aimed upward. A possible executed man lying on the floor was found in 1923 near Deir el-Bahari in Egypt (Winlock 1945, 13). By further studying the damage to the bone and the arrowhead itself the possible force of impact may be reconstructed. The shape of the wound may also indicate the size of the arrowhead and its angle of entry into the bone. When the degree of preservation is good the arrow's shaft may still be present, like with the bodies, like other bodies found at Deir el-Bahari (Winlock 1945, Plate VII-VIII). Puncture-wounds can often be ascribed to ranged weaponry, just like other types of minor blunt trauma. Blowgun-darts and rounded spearheads will often leave round entry-marks in the bone. The use of sling-shots is often attested by the presence of sling-missiles and not by the blunt trauma they can inflict.

The infantry soldier was however equipped with melee-weapons aimed at close-range combat for most almost the entire human history. At the battle of Towton for example the majority of wounds was caused by sharp- and blunt-force trauma and only few projectile-wounds have been identified (Novak 2010, 99). Among the casualties of the battle of Visby (1361) the amount of projectile-trauma was significantly higher. A number of 126 cases of arrow-wounds are mentioned. It is also stated that "*Injuries from lances are impossible to distinguish from arrow wounds, because arrows have been of different sizes"* (Thordeman et al. 1939, 160). Not all of the 126 wounds may have been caused by projectiles, as is later also stated (Thordeman et al. 1939, 186). Modern wounding ballistics may be used the distinguish projectile-wounds from those inflicted using pole-arms by looking at fracturing patterns and the edges of the wounds. Arrow wounds often puncture the bone and leave a linear fracture near the entrance wound and often partially resemble an incised wound, like with sharp-force trauma (Karger et al. 1998).

With the invention of the firearm however ranged weapons and bullets became the main armament. Projectile-trauma and the infections caused by these projectiles were now the main cause of perimortem trauma and actual death. Di Maio distinguishes four types of gunshot-wounds based on the distance to the target: contact trauma, near contact trauma, intermediate distance trauma and distant or long-range gunshot trauma (Di Maio 1991, 82). The distance to the target influences the amount of kinetic energy which will be transferred onto the target and it will thus influence the amount of damage and the

associated wounding pattern. Further classifications of gunshot trauma can be made according to the type of weapon which was used, the body-part which was inflicted or the setting in which the trauma was caused.

When a bullet strikes its target it will have a point of impact where it will leave an entrance wound. When the projectile is fired and has entered the external ballistics-phase its behaviour in this phase will affect the shape and size of this entrance wound. If the projectile follows a flat trajectory with an ideal motion of rotation (the projectile will spin) it will often leave a round entrance-wound. The projectile may however start to tumble while in the external ballistics-phase and hit the body at an oblique angle at the point of impact. This will leave an oval or irregularly edged entrance-wound (Lagarde 1914, 52). Gas burns of the bullet may also leave marks around the wound, also on bone.

When the projectile hits a body it will enter the terminal-ballistics phase. The projectile can either pass through the soft tissues of the body in a straight line without touching the bones, leaving no visible traces for the archaeologist. Whenever the projectile does collide with a bone it may become lodged in the bone and get stuck in the body or it may be deflected into another direction than the direction of fire. The bone itself may be penetrated when the bullet reaches speeds over 200 F/sec (Di Maio 1999, 130). The entrance-wound of a bullet in bone will often leave a bevelled entrance with the inverted edges following the direction of fire (Di Maio 1999, 130). It should be noted that the entrance-wound does not always represent the exact calibre which was used due to deformation in the tissue. It can however be used to eliminate certain calibres, like those which are too small to have inflicted the wound. According to Lagarde's work in 1914 which is still used today, around 22% of all gunshot wounds sustained in war impact on bone (Lagarde 1914, 54). In post-1914 warfare this percentage may have become higher since most weapons have become more accurate and the torso and head, both containing a lot of bone, have become the main target-zones on the human body.

Whenever a projectile leaves the human body again the projectile will leave an exit wound. Exit wounds are often larger than entrance-wounds, they typically are cone-shaped and have everted edges when passing through bone and their shape can be highly variable (Lagarde 1914, 53; Di Maio 1999, 130). The bone at the exit wound will often be extremely splintered, while the bone at the entrance-wound may be partly intact (Thali et al. 2002, 224). Each type of projectile will leave different types of entrance- and exit-wounds. Musket balls will typically have a triangular or star-shaped exit wound with everted edges (Lagarde 1914, 33). When the projectile does not leave the body it may either be lodged in a bone, being preserved in-situ or it may become stuck in soft tissue.

When the tissue decomposes the projectile in the latter case can still be found near its original position within the body within the associated stratigraphic layer. When the bullet is found with the body it has to be examined for traces of impact. The bullet may often be de-formed during impact with the bone while bullets carried along in the soldier's equipment will usually be intact and will thus not have caused trauma.

The wounding-pattern and further damage to the bones can then be studied by specialists like forensic archaeologists and physical anthropologists. Just like the entrance-wound, the wounding pattern and amount of damage caused by the projectile are related to the projectile itself and its behaviour during the external-ballistics phase. The most important of these factors are the projectile's mass, shape, velocity, kinetic energy, drag, stability, precession, tumbling pattern and centre of pressure (Bellamy & Zajtchuk 1990).

Low-energy bullets for example will leave different kinds of fractures on the bones, while high-energy bullets will cause the bone to break into multiple pieces, creating a comminuted fracture (Rose 1988, 106). Disintegrating ammunition or dum-dum ammunition will often cause bone to be shattered, using the small fragments of splintered bone (*spiculae*) as secondary missiles which damage soft tissue and vital organs. These *spiculae* can be found within the body matrix by the archaeologist. Fractures are often visible around the bullet-wounds, often radiating around the wound. Fractures can also be visible on the skull between the entrance- and exit-wounds (Thali et al. 2002, 224).

**4. Wounds inflicted by (artillery) ordnance and blast-trauma**

Ordnance is larger than the ammunition used in small-arms. It often carries a larger amount of primer and powder and it is often explosive. Ordnance primarily kills its targets by the combination of blast-trauma and projectile-trauma, sometimes in combination with burn-trauma. There are many types of ordnance available. Early cannon balls for example were non-explosive and they were mainly used to destroy structures. When used against human targets the balls simply tore away limbs or punched holes into the human body. When rolling across the ground the balls tore off feet and lower legs, successfully incapacitating their targets. With the development of grenades and professional artillery ordnance became explosive. An piece of ordnance is often referred to as a 'shell.' A shell typically consists of a fuse or ignition mechanism, an explosive element and casing (Hayda 2004, 104). Ordnance could also be used to deliver lethal materials onto the battlefield from a large distance by loading the shell with gas, phosphorous, *flechettes* or other material.

The explosion can cause three types of blast-trauma. Primary blast-trauma is caused by the shock-wave and the amount of pressure caused by the rapid expansion of gas and air, rupturing internal organs and air-filled cavities in the human body, like the lungs. Secondary blast-trauma is inflicted by the pieces of material launched from the piece of ammunition. These may be parts of shrapnel, *flechettes* or other materials contained within the projectile or pieces of glass, wood, metal or other materials from the environment which become secondary missiles due to the explosion. Glass-fragmentation seems to be the major cause of blast-injury (Hayda et al. 2004, 101). Tertiary blast-trauma is caused because the human target may be blown away by the force of the explosion, colliding into objects and thus suffering from blunt- and sharp-force trauma. All other injuries caused by the explosion, including burn-trauma are classified as quaternary blast-trauma (Born 2005, 281). The archaeologist first has to establish the locations of the entrance-wound and the possible exit-wound. Whenever a projectile is still present within the body-matrix its orientation may be used to re-trace the direction of fire and the location of the bullet-channel through soft tissue.

**Appendix C: Looting the Battlefield**

After a battle, the battlefield would be littered with the dead and the dying, with weaponry and equipment, with uniforms and dead animals. Usually the dead were buried and equipment was gathered to be re-used or transported away from the battlefield. It may also have been used to create a monument, like the Greek *tropaion.* Other remains of the battle will have disappeared due to post-depositional processes and disturbance of the site. One of these post-depositional processes is looting. Battlefield looting takes place from the moment of battle up to the present day. Conflicts and looting are inextricably connected to each other. The lawlessness that often comes with conflicts often leads to the unrestricted looting of property, artwork and everything else which is of interest to a certain party of looters. Both military forces or combatants as civilians and non-combatants are and have been guilty of looting during times of conflict throughout human history. Ancient battlefields in their current state are also subjected to looting, mainly by detector-amateurs who neglect proper finds-registration or militaria-collectors who are completely unaware of the existence of an archaeological context concerning artefacts. Finally, military cultural heritage is not only being threatened on ancient battlefields, but cultural heritage in general is also being threatened on current battlefields and in present-day conflict zones around the world.

Looting can take place on the public or common level, undertaken by large social groups or societies as a whole. Looting can also take place on the private level, where personal and financial gain may play an important role. The capture of enemy territory and the procurement of food and rations by plundering this territory is one of the reasons of conflict in tribal communities. Looting on communal level is often intentional behaviour and it may be the initial goal of a military campaign. People may actually join the campaign in order to improve their wealth by looting. When food shortages arise for example a military campaign may be mounted to take the food from others by force. Communal looting may also be a side-effect of a conflict. In many conflicts official booty was taken from the battlefields by the victorious party. Official loot was often claimed by the leaders to be transported back to their own territory. Because they have defeated a certain faction, the victor will claim the property of the defeated party and see their victory as legitimisation to do so. This kind of looting often took the shape of the removal of national art-treasures which were often added to private-collections of high-ranking individuals in the army or nobility or they were added to museum-collections in the home-country of the victorious party. The ‘collection’ and looting of art is well-known from the looting of museums around Europe by the German National Socialists during

the Second World War. Armies also looted to upkeep their logistics. At the battle of Brandywine (11 September, 1777) the fences around the Chadds Ford were demolished to be used as firewood and metal was procured by the soldiers to make ammunition (Smith 2008).

Looting on the individual level is however much more common. Just like the present-day battlefield looters are taking away the personal effects of the dead from battlefield-sites, the contemporary people also looted from that same battlefield and they both do it for personal or financial gain, mostly because of poverty. These people are called 'subsistence-looters' (Yahya 2008, 497; Hollowell 2006; O'Sullivan 2000).

Many soldiers and civilians alike saw the lawless battlefield scattered with the dead and dying as place of opportunity and personal gain and they often went 'trinket-hunting' on the battlefield. 'Treasure-hunting', souvenir collecting' and other euphemisms were used for the collection of the effects of the battlefield dead for personal gain. In fact it was ordinary petty-looting (Harrison 2008, 775). Treasure-hunting could be aimed at the recovery of commercially valuable materials, but it could also be aimed at the taking of items which could be re-used (Roach 1996, 351; Christiansen 2004, 62). Civilians and soldiers alike took away items from the fallen which could be sold or traded for financial gain, but they also took items which they personally liked to keep in their private collections. Clothing and expensive pieces of equipment were also popular among soldiers and civilians. A report from the battle of Lafelt for example mentions how civilians were stripping the clothes of a wounded soldier who was not dead yet (Notermans 1997, 116**)**.

For soldiers battlefield looting could have a deeper significance. Pieces of equipment may have been taken from a fallen friend or comrade as memento, but also because the equipment could have been used to replace damaged or lost equipment belonging to the looter. Clean and warm boots seem to have been very popular in cold environments. Bodies in a Napoleonic war-grave showed traces of amputated feet and cut tibias, probably to take the boots from the corpses (Signoli et al. 2004, 226). Re-use of military equipment was quite common. Medieval warriors were often stripped of their armour and clothing before being buried, probably by other warriors to re-use their equipment, but also by looters (Thordeman et al. 1939, 94). Popular weapons like ornamented swords or special types of firearms and enemy equipment like flags and insignia were often taken by soldiers. Field-stripping can also be regarded as an act of humiliation and degradation of a defeated enemy (Harrison 2008, 777). Some fallen U.S. soldiers at the Battle of Little

Bighorn were stripped of their clothes and equipment and were afterwards ritually mutilated for this purpose (Brininstool 1994, 60-62).

Looting did not only take place on the battlefields, but also in homes and on private property. Soldiers living off the land like the armies in the 18th century looted the farmsteads and houses in the areas they passed through. This looting and plundering often seem to be associated with the procurement of food. Live-stock, edible birds and horses were often taken. During the American Civil War a certain Billy Crump of the 23rd Ohio went looting in West-Virginia and came back with 50 chickens, 2 turkeys, a goose, 20 dozens of eggs and 30 pounds of butter (Davis & Pritchard 1998, 154). Another example is the looting of liquor, jewellery, silver tableware and other items of value from houses. In his celebrated book '*Band of Brothers'* Stephen Ambrose mentions the most beloved items for looting by the men of the 101st Airborne Division in the Second World War: "*...Lugers, nazi-insignia, watches, jewellery first editions of Mein Kampf and liquor..."* and the absence of regular civilian laws as the main reason for the looting from houses, as well as from fallen soldiers. (Ambrose 2009, 248).

Although looting did take place, it was often undesired by commanders. Looting could be severely punished. Looting became undesired by European army commanders in the late seventeenth century, but it never stopped (Creveld 2005, 213). Many armies seem to have had official rules and treaties which were aimed at the prevention of looting. Many modern military manuals prohibit looting and pillaging and mention it as being a crime of war (Alvermann 2005, 1080). After the battle of Megiddo (around 1457 BC) under Tuthmoses III, the ancient Egyptian armies were looting, but they were stopped by their commanders: "*And when his authority had gained power over them (the soldiers), the looting of their horses and their chariots of gold and silver, which was made as 'fast loot,' stopped... ... and then they were turning in the loot which they had acquired, namely hands, namely prisoners-of-war, namely horses and chariots of gold and silver in their placating the heart of their lord*" (Goedicke 2000, 76). At the burial of Allied soldiers by German soldiers at Fromelles, July 1916, the looting from the bodies by German soldiers was strictly prohibited (Pollard & Whitford 2009, 206).

Battlefields in time become sites of natural and cultural heritage themselves and have been looted over time. But the cultural heritage which was already present in the area long before it became a battlefield also came under fire when conflict erupted. In times of conflict archaeological and cultural heritage are often threatened with destruction and more often with looting. With archaeology studying the heritage of the past, it is also involved with the protection of heritage. Conflict archaeology should therefore not only

be concerned with protecting fields of conflict as sites of cultural heritage, but also with the protection of cultural heritage on modern battlefields. Recent examples are the massive looting of the Iraqi museum in Baghdad, 2004 and the destruction of the Bamiyan Buddhas In Afghanistan by the Taliban.

Contemporary looting by detector-amateurs is becoming a real threat. Looted objects may have several layers of value. First of all they may have an emotional significance for the one who possessed and lost them or the ones related to the deceased possessor. They can also be used as means of identification of the remains of a deceased person. They may be objects of art, carrying a deeper significance for larger social groups or they may have an specific or religious meaning. They may also contain important or secret information which is of no personal value, but which may change or may have changed the course of written history.

**Appendix D: Ammunition Checklist for the Archaeologist: Ammunition**

- Ammunition is found:
  - ⇨ Registration of location using GPS/Theodolite and coordinate-system
  - ⇨ Photograph the ammunition in-situ
  - ⇨ Register the orientation of the ammunition when possible and measure depth beneath the surface.

- In-situ visual inspection
  - ⇨ Size and Shape
  - ⇨ Outer bands and markings
  - ⇨ Category of ammunition
  - ⇨ Fired or Unfired (Deformation)
  - ⇨ Visible condition (corroded)

- Ex-situ visual inspection
  - ⇨ Stamp on the cartridge/engraving and further markings
  - ⇨ Visibility of use-wear, rifling or production marks
  - ⇨ Estimation of calibre when not provided on cartridge
- Detailed Study
  - ⇨ Calibre Measurement
  - ⇨ Residue analysis
  - ⇨ Weight
  - ⇨ Propellant analysis
  - ⇨ Microscopic study of production and use-wear
  - ⇨ Rifling analysis (compare with weapon when found)
  - ⇨ Study of deformation
  - ⇨ Modifications to the ammunition
- Reference Study
  - ⇨ Ammunition Type
  - ⇨ Manufacturer, year of manufacture, location of manufacture
  - ⇨ Faction using the ammunition
  - ⇨ Possibility to identify exact shooter or weapon