Acknowledgements

Over the past five years, I have felt very privileged that I have been able to turn my passion into an actual job. One of my earliest memories dates from the summer of 1989, when I was just 4-years old and on holiday near the Finnish town of Lieksa. In addition to the everlasting sunny days, the beautiful forests, the countless lakes and picking cloudberry fruit, I vividly remember some Finnish trenches of the Winter War (1939–1940) near today’s Finish-Russian border. Perhaps this was where my endless curiosity about modern conflict began.

I dedicate this book to my family. Academic research has been a great journey, but without my supportive family it would have been much more difficult to reach the destination. First and foremost, I have to thank my parents, who have supported me over the years through all the good and bad times. Mum and dad, I could not possibly wish for better parents or for more loving grandparents for Axl! I hope you’ll still let me drag you to the muddy fields of France and Flanders every November. Without the help of my brother and best friend Jef, I would never have finished this thesis in 4.5 years’ time. During the last months he must have changed more diapers than I did, so that I could continue writing – at cost of his own PhD research. Furthermore, the countless visits to distant battlefields and unknown vintners from Finland to Slovenia and from Estonia to Spain would not have been so much fun without you.

I cannot express in words my gratitude towards my wife for her eternal encouragement. First of all, Rita was crazy enough to marry me and second, it turns out that she still loves me – even though I forced her to traverse remote battlefields in her beautiful dresses. She has already accompanied me to Lithuania, Ireland, France, Flanders and Germany for my research and I hope we can continue to do so for the rest of our lives. Rita still reacts as sweet as ever when I enthusiastically show her a piece of rust or some inclination in a field, meaningless to her. After so many battlefield visits, I solemnly promise you can now go shopping more often when we’re on holiday! Despite her busy job, she was able to invaluably improve my manuscript with her feedback on every aspect of this study as a stringent reviewer. Yet the best gift you ever gave me is our beautiful son Axl, who showed me that there are so many more important things in life than work and research.

I also owe many thanks to my supervisor, Prof. Dr. Nico Roymans (Vrije Universiteit) who was brave enough to guide me during my research, although the subject was so modern in comparison to his own field. I am very grateful for the liberty he has given me throughout my time as a PhD candidate. Surprisingly enough, I also enjoyed teaching and am thankful for the trust he had in me when I was instructing a new generation of students. The comments of my co-supervisors, Prof. Dr. Jan Kolen (Universiteit Leiden) and Prof. Dr. Rob van der Laarse (Universiteit van Amsterdam) greatly enhanced my study. Jan was the first who actually took my topic seriously when I proposed it back in 2006, still a student. Rob’s guidance sharpened my research and my research skills, especially when he suggested solutions that contradicted my own views. All three are well aware of the bumpy road I started on but they never let me down.

I would like to thank the members of the thesis committee, Prof. Dr. Hans Renes (Vrije Universiteit), Prof. Dr. Michael Meyer (Freie Universität Berlin), Prof. Dr. James Symonds (Universiteit van Amsterdam), Prof. Dr. Hanneke Ronnes (Universiteit van Amsterdam), Prof. Dr. Martijn Eickhoff (Nederlands Instituut voor Oorlogsdocumentatie), Dr. Gertjan Plets (Universiteit Utrecht) and Dr. Jos Bazelmans (Rijksdienst Cultureel Erfgoed) for their willingness to examine the present thesis. Furthermore, the chairman Hans Renes also gave me the opportunity to teach his students for the course module ‘Land-
scape Biographies.’ Personally, it was a unique experience to give a guest lecture in the course module that had triggered me so many years ago to embark on PhD research.

During my research I received a lot of help from conflict archaeologists abroad. I will never forget the warm welcoming when I just started this study. In my very first month as a PhD researcher I attended the conference ‘Archéologie de la violence – violence de guerre, violence de masse’ which was held in Lens, France, where I met the ‘Godfather’ of conflict archaeology, Douglas D. Scott (Archaeological Institute of America). His encouragements were the greatest compliments a young researcher can receive. I greatly enjoyed the dinners and drinks together in Lens, Glasgow, Amsterdam, Vilnius and Dublin with (in random sequence) Tim Sutherland (University of York), Gabriel Moshenska (University College London), Tony Pollard (University of Glasgow), Iain Banks (University of Glasgow), Suzie Thomas (University of Helsinki), Caroline Sturdy Colls (Staffordshire University), Mads Kähler Holst (Aarhus University), Augusta McMahon (University of Cambridge), Margaret Cox (Cranfield University) and Alfredo González-Ruibal (Consejo Superior de Investigaciones Científicas). Since I was not able to present any research yet at Lens, I was very happy I could be of help with my basic knowledge of French.

Every researcher needs rest and relaxation. I would like to thank my closest friends Marenne Zandstra, Rianne van Henten and Robin Bieze for all the good times we have had over the years – ever since we became acquainted as students. In different compositions we have been to Paris, Berlin, Munich, Vienna, Prague, Antwerp, Gent, Waterloo and Brussels. Each year, we have at least one reunion which always seems to pass too quickly. Robin, the E3-Beach and Wynand Fockink have been forgiven by now but definitely not forgotten. I am glad you found your love in Germany, but it is a pity that we see each other much less often since you emigrated. Later, I also met Barbara Oosterwijk, Alexandra Pleșa and Judith Kindinger and renewed my contacts with Kimberley van den Berg, a fellow PhD at the Vrije Universiteit. Thanks for the memories in Amsterdam!

I am also indebted to the supporting staff, especially Bert Brouwenstijn for making this thesis look like an appealing book, Jaap Fokkema, who was always willing to scan some old images or create a wonderful satellite image, and Benno Ridderhof who, in 2015, brought me to the International Conference on Cultural Heritage and New Technologies in Vienna and introduced me to Menno Kosian of the Cultural Heritage Agency (RCE). Menne Kosian was kind enough to introduce me into LiDAR. Later, Willem Beex showed me the ropes of this technique. Without the help of Willem, chapter 6 would have never been so vividly and beautifully illustrated. I am confident that Willem would have been very proud of what this thesis has turned out to be. After all his help, I am very sad he never witnessed the end-product and my defence since he passed away far too soon.

During my research, the discord between academic and commercial archaeologists became all too visible – from minor irritations to resolute obstruction. I did my very best to bridge this division and hopefully succeeded in doing so for a small part. I tried to be as nuanced as possible without losing track of academic discourse. In my experience, it is better to take small steps than to use big words. I am very grateful to Daniël Stiller (Archol) who gave the first comments on chapter 5 as an outsider. Although very busy himself, he did find the time to read this chapter not just once but twice, thus invaluable improving this part of my study. If any errors remain, these are entirely my fault.

There are many more people who have helped me along the way and I hope I included them all. David Passmore (University of Toronto) and David Capps-Tunwell (Director of Conflict Landscapes Research Services) were of great help during my research, in particular during the categorisation of German logistics depots. I also owe many thanks to Maaike Groot (Freie Universität Berlin) for editing my paper for the journal of Landscape Research. She also invited me to give a guest lecture at the Freie Universität Berlin. Berlin is, in my opinion, the most beautiful, interesting and inspiring capital in the world. To be able to visit the city for work was really a dream come true.

I would like to thank Mark Hannay for editing this thesis for language. For their kind permission for using various images and (or) for providing useful information, I am very grateful to the following
persons and institutions (in random order): Arne Schumacher, Katja Protte (Militärhistorisches Museum der Bundeswehr Dresden), Manuel Fernández-Gótz (University of Edinburgh), Mads Dalegaars (foto-/medieafdelingen, Moesgård), Augusta McMahon (University of Cambridge), Captain Geert Jonker (Senior identification specialist of the Recovery and Identification Unit, Royal Netherlands Army), Major Bart Aalberts (Vliegtuigberging Logistiek Centrum Woensdrecht), Augusta McMahon (University of Cambridge), Alfredo González-Ruibal (Consejo Superior de Investigaciones Científicas), Douglas D. Scott (Archaeological Institute of America), Tim Sutherland (University of York), Bert Brouwenstijn (Vrije Universiteit), Marc Dewilde (Vlaams Instituut voor het Onroerend Erfgoed), Simon Verdegem (Ruben Willaert), Alain Jacques (Service archéologique d’Arras), Juliane Lippok, Sabine Eickhoff and Petra Woidt (Brandenburgisches Landesamt für Denkmalpflege und Archäologisches Landesmuseum, Wittstock), Ulrike Binding (Landesamt für Denkmalpflege und Archäologie Sachsens-Anhalts), Nico Arts (urban archaeologist, gemeente Eindhoven), Peter van den Broeke (Gemeente Nijmegen), Rutger Bol, René de Kam (Erfgoed gemeente Utrecht), Minja Hemminga (Archol), Carolien Prins, Gert Stein (Nationaal Monument Kamp Amersfoort), Philippe Gorczynski, Olaf Langendorff, Anton Cruysheer, Sander Koopman, Arthur Sloos and Marjolein Verschuur (Rijksdienst voor het Cultureel Erfgoed), Willem Beex (†), David Capps-Tunwell (Director of Conflict Landscapes Research Services), David Passmore (University of Toronto), Stefan Harrison (University of Exeter), Andy Brockman, Caroline Sturdy Colls (Staffordshire University), Dwayne Beckers, Godfried Scheijvens, Imperial War Museum, Bundesarchiv, Vlaams Erfgoed Centrum, Beeldbank Rijkswaterstaat, Ministerie van Defensie, Beeldbank van de Rijksdienst voor het Cultureel Erfgoed. In case I have forgotten anyone, I hope I will be forgiven.

Chapter 1 – Introduction

1.1 THE TRAGEDY AT MONT CORNILLET

Reims, France, 1917. The Battle of the Hills, better known as the Nivelle Offensive (17 April–20 May) has reached its climax. The German lines have been under attack by French forces for over a month. Most of the Germans’ first and second lines between Soissons and Reims have been captured after fierce fighting. East of the city of Reims, there are several important high points, including Mont Cornillet, with its 207-metre summit. After the heavy losses at Verdun and the Somme in the year before, the German Army is in desperate need of fresh troops. The Württembergisches Infanterie-Regiment Nr. 476 (Inf. Reg. Nr. 476) is formed in January 1917, consisting mostly of young, unexperienced troops. Some more experienced officers and non-commissioned officers are added from other regiments to form the backbone of Inf. Reg. Nr. 476, including Leutnant Carl Heinrich Albert Schumacher (*1891–†1980). After several short weeks of training, the regiment is sent to France in March, receiving its baptism of fire in May 1917.

Inf. Reg. Nr. 476 arrived at Mont Cornillet on 14 May, where an important underground fortress had been built that consisted of three long, parallel tunnels dug into the limestone. The largest of these tunnels was 280 metres in length and was named ‘Lux’, featuring entrances at both sides. The tunnels, which were approximately two meters wide and two meters high, were also interconnected. French High Command was aware of the existence of this underground fortress, and French troops unsuccessfully attempted to seize the summit on 17 April and again on 30 April 1917. The hilltop provided the German troops with an excellent view over the lower-lying French positions, which prompted the French to engage in resolute attacks to seize Mont Cornillet.

Seeing as small-caliber artillery had no effect on the German defense positions at Mont Cornillet, heavy artillery (380 mm) was brought into position. On 20 May, a severe artillery bombardment started on the German lines at 07:30, mainly aimed at the entrances of the tunnels. Infantry attacked at 15:15 and seized the hill the very same day. Meanwhile, a disaster had occurred underground. At the very start of the artillery bombardment, one of the tunnels received a direct hit. At 09:00, two other direct hits caused parts of the tunnels to collapse, annihilating a complete battalion. Many soldiers were killed by the collapsing ceiling, but most died as a result of carbon monoxide poisoning. Due to the lack of oxygen in the tunnels after the explosions, all candles extinguished. The survivors had to find their way out in the dark, but only a few succeeded in doing so, including Leutnant Schumacher.

When Inf. Reg. Nr. 476 arrived at Mont Cornillet, it had consisted of 64 officers and 2419 soldiers. During the events of 20 May 1917, a total of 39 officers and 1064 soldiers were killed in action. This was one of the largest groups of German soldiers enclosed underground during the war. A year before, on 8 May 1916, an unattended cooking fire detonated ammunition stores and flamethrower fuel in the tunnels of Fort Douaumont near Verdun. During the ensuing firestorm, 679 German soldiers perished. Due to the heavy artillery fire on the fortress, the bodies could not be buried outside and were therefore sealed off in one of the tunnels. A similar event occurred amongst French troops at the nearby Tavannes 1

1 Lieutenant.
2 Nick 1921, 3; Schumacher 2011, 12 and 18.
3 Nick 1921, 15-16 and 20-21; Schumacher 2011, 27, 44.
4 Nick 1921, 21-22; Schumacher 2011, 68 and 70.
tunnel on 4 September 1916. Over 500 soldiers were killed in the fire, probably also as a result of careless cooking in the tunnel. After the disaster at Mont Cornillet, General Paul von Hindenburg (1847–1924) forbade the construction of such large underground fortresses to prevent similar calamities in the future.5

After the capture of the summit and the tunnels, French troops collected and concentrated the German dead in one of the collapsed tunnels and walled them off. Parts of the tunnels were restored and the air circulation was improved. At the end of the war, Mont Cornillet became part of a French military training site, making it inaccessible to the public. In contrast to Mont Cornillet, the soldiers enclosed at Fort Douaumont are commemorated with a plaque and the sealed tunnel with the soldiers' remains is regarded as an official German military cemetery. The French soldiers of the Tavennes tunnel were exhumed after the war and buried with full military honors at the French cemetery in front of the famous Ossuary of Douaumont.6

After World War I (WWI), a vivid trade in German gold and silver coins started in the villages surrounding Mont Cornillet, which were rumoured to have been taken from the dead in the tunnels. During the German occupation of France in World War II (WWII), Major Richard Büchner tried to recover the remains of the German soldiers who had perished in the previous war, conducting several campaigns in 1943 and again in 1944. He did find an entrance to the tunnels, but was unable to reach the locations with the human remains. Although local inhabitants did remember the stories of the walled-off German soldiers somewhere underground on Mont Cornillet, this huge war grave was generally forgotten by the public.7 However, on local flea markets, German military equipment would often come up for sale, including bucket belts from Württemberg.

Reims, France, 1968. A group of German soldiers of the Pionier-Lehrregiment der Bundeswehr was sent to France to maintain several WWI German military cemeteries in the Champagne region. The commanding officer, Obersteutnant Hermann Köberl, was not aware of the events that took place underground at Mont Cornillet over 50 years ago and first learned of this story from a local farmer. His curiosity never faded – in the following years, he investigated the history of Inf. Reg. Nr. 476 and eventually his private research resulted in the successful recovery of the human remains from the tunnels at Mont Cornillet during two campaigns, conducted in 1974 and 1975 respectively.9

On the historical regimental maps, the tunnels were drawn and located on the northern side of the hill. However, the correct position was on the southern side – in the midst of the sketched French positions (Fig. 1.1). The recovery project started in the summer of 1974 and lasted for six weeks. As a token of reconciliation, French and German soldiers worked side by side during the recovery of the soldiers who had died so many years before. During the work, the labourers discovered French graffiti underground dating back from 1920 until 1931. Although it was a prohibited area, some people had clearly managed to enter the tunnels.10 The rumours that military equipment and coins had been taken from the Mont Cornillet proved to be correct.

It turned out to be very difficult to reach the tunnel on the left (Stollen 1), which had collapsed entirely. When the rubble had been removed and the sealed wall could be opened up again, the workers stumbled across leather boots, bucket belts, ammunition pouches, helmets, weapons, munition and hundreds of human remains (Fig. 1.2). In general, the artefacts were in very good condition. A prayer book of 1917 was still readable, as were several recovered private letters. The encountered ammunition, both for small firearms as well as for heavy mortars, appeared to have just left the German factories. Several victims were encapsulated in limestone, which had left behind a Pompeii-like imprint in some of the tunnels. As expected, many of the soldiers were between 18 and 20 years of age.11

---

5 Nick 1921, 27; Schumacher 2011, 130.
7 Schumacher 2011, 118 and 156.
8 Lieutenant Colonel.
9 Schumacher 2011, 14 and 114.
10 Schumacher 2011, 120, 122 and 128.
11 Schumacher 2011, 125, 139–140, 149, 154 and 158.
The recovery works was widely covered by the media, both in France and Germany. Locals – farmers, mayors, vicars – often visited the site, bringing champagne and food for the labourers. Veterans were also quick to show up, including both French and German ex-soldiers. Oberstleutnant Köberl had hoped to finish all the recovery work within six weeks’ time, but at the end of the campaign, not all tunnels had been cleared yet. The first campaign saw the recovery of 267 German soldiers, but, surprisingly, not all recovered human remains were Germans. In the tunnels, the workers also discovered a French soldier and an officer. Commandant Paul-Adolphe Champel (*1866-†1917) of the French 48th Infantry Regiment was wounded during a small-scale attack on the hill on 16 May. After being captured, he was given medical treatment in the tunnels and buried underground, along with his enemies, during the bombardment of 20 May 1917.12

Mont Cornillet, summer 1975. The tunnels are reopened for one final time. Unfortunately, all the tunnels that had been cleared the year before, had partially collapsed due to heavy rainfall. The recovery works are set up once more, and a further 63 individuals are uncovered. In two years’ time, a total of 330 German soldiers were discovered in the tunnels beneath the summit of Mont Cornillet. Many of them were positively identified, but could not be buried individually.13 Usually, German WWI soldiers are harder to identify than Allied soldiers, since most historical documentation was destroyed during the bombings on Germany during WWII.14 The records of the former armies of Württemberg and Bavaria

---

13 Schumacher 2011, 176, and 185.
did, however, survive the Allied bombings. All human remains were reburied at the German military cemetery of Warmériville (Fig. 1.3). During the reburial ceremonies, several veterans of Inf. Reg. Nr. 476 were also present to pay their respects to their former comrades.\textsuperscript{15}

Did Carl Schumacher know about the recovery of his former comrades at Mont Cornillet? He passed away in October 1980, and during his lifetime he never talked about his war experiences with any of his relatives. In the winter of 1980-1981, Arne Schumacher, his grandson, was given a photo album with war pictures by his grandmother.\textsuperscript{16} In order to find more pieces of his family history, he obtained the original regimental history, the \textit{Württembergisches Infanterie-Regiment Nr. 476 im Weltkrieg 1914-1918} by Oberst\textsuperscript{17} Nick (1921), from which he learned about the tragedy at Mont Cornillet. Later in his life, Arne Schumacher also met Oberstleutnant Köberl, using the pieces of the puzzle he had managed to collect to broadly reconstruct the events of 20 May 1917, based on which he published a book.\textsuperscript{18} A century later, Inf. Reg. Nr. 476 remains in people’s memory. On 20 May 2017, the French Army opened the site for the general public for this special occasion and on the day of the commemoration, locals, mayors, dignitaries and schoolchildren from France and Germany attended the commemorative ceremony at the summit of Mont Cornillet.

\textsuperscript{15} Schumacher 2011, 183 and 188.
\textsuperscript{16} Schumacher 2011, 6.
\textsuperscript{17} Colonel.
\textsuperscript{18} Schumacher 2011.
During and after WWI, ‘heroism’ was underlined in literature as well as in depictions in all countries that had fought the war (Fig. 1.4). Over the course of the past centuries, warfare has been romanticised greatly by all nations worldwide. An important, recurrent topic has been how to triumph in the most honourable way, rather than how one could prevent war. This process of romanticising the past is directly connected to the Romantic Era (approximately 1800–1850). For states, warfare was typically regarded as a heroic exploit, and only recently changed into something painful. Since the end of WWII, the communal attitude towards war in general has changed significantly. In today’s era of the witness and politics of regret, the commemoration of fallen soldiers has shifted from glorification to victimisation. Even the German soldiers are nowadays seen as victims by their former enemies. Archaeology and cultural memory, especially when more recent periods are concerned, cannot be separated. The power of family ‘lore’ and ‘memory’ should not be underestimated either.

---

Fig. 1.4. ‘Verdun – The Last of the Company’ (1937) by Herbert Schnürpel (*1890–†1943), oil on canvas. In the National-Socialist epoch (1933–1945), the painter was very popular for his ‘heroic’ depictions of WWI. Nowadays, the painting is regarded as an expression of the horrors of war (*Militärhistorisches Museum der Bundeswehr*, Dresden, BAAG 3169).

---

19 Sutherland and Holst 2005, 3–4.
21 However, this has only been the case in the West, and only by afterthought. Nothing has changed in respect to the current war on terror for example. Pers. comm. Rob van der Laarse.
22 Meire 2003, 29 and 91–93; Suleiman 2006, 13 and 266; Todman 2008, 210; Login 2015, 120.
1.2 AIMS AND RESEARCH PERSPECTIVES

Although the project at Mont Cornillet was *sensu stricto* not conflict archaeology, many ingredients for the development of this specialisation were already present. In France, it would last until 1991 before the first official archaeological excavation was conducted on a site of solely modern warfare. As this study will demonstrate, conflict archaeology is often the result of community interest. For both the preservation and conservation of sites of modern conflict and, directly related, to the social basis for archaeological heritage management, community interest is always of the utmost importance. Most of the earliest work in conflict archaeology was conducted out of personal interest rather than as a result of development control or grant-funded research. An attempt to recover the human remains for identification was necessary due to grave looting. Not much has changed since – looting can still be observed on practically all conflict-related sites. Personal identification of the dead would become much more difficult if all tokens of identity were taken.

There are five major categories of data for conflict archaeologists, namely (1) human remains, (2) iconography, (3) artefacts, (4) architecture, including earthwork field fortifications, and lastly, (5) historical sources. In archaeological terms, the site at Mont Cornillet was perfect for archaeological research. Since the site was sealed off for visitors directly after WWI, the conditions produced an area with high research value. The historical sources, however, should not be trusted without asking questions. On the regimental maps of Inf. Reg. Nr. 476, the position of the tunnels proved to be incorrect, for instance. Archaeologists should always (re-)evaluate the available historical records and oral histories. A combination of contemporary sources, oral history and a geographical reconstruction of the site provided an improved perspective on the events, in addition to its main purpose: recovering the human remains. Although most attention was given to the mass grave, the alternate German and French occupation of the tunnels during WWI was noted as well. The recovery works received overwhelming community interest and was covered by several media sources. Without the media, the shift of awareness amongst professional archaeologists would have taken place much later and traditional archaeological funding agencies would not have supported conflict archaeological research at the very start. Although conflict-archaeological research is often based on national sentiments and strictly divided by national borders, both French and Germans worked side by side during the recovery works at Mont Cornillet. Since the recovery work in 1974 and 1975, conflict archaeology has developed rapidly. Nowadays, it is a research domain with a wide geographic and temporal scope, ranging from the Palaeolithic up to modern times. However, archaeology should not only limit its focus on long-term processes, but also incorporate the impact of past events into its narratives. As a discipline, archaeology is regarded differently in different countries. The archaeology of conflict has a multi-disciplinary character, using concepts, insights and methods from social anthropology, military history and heritage studies. This specific and distinctive branch of archaeology reveals the ‘bottom-up’ history of human violence and suffering.

---

24 Deeben *et al.* 1999, 191; Sutherland and Holst 2005, 7; Pollard and Banks 2010, 440.
29 Cf. Pollard and Banks 2007, xii.
33 Sturdy Colls 2012, 75.
34 Carman 2013, 66 and 95; Sagona and Birkett-Rees 2016, 83; cf. Capps-Tunwell *et al.* 2016a, 327.
This scheme was originally developed by Dutch archaeologist Jan Slofstra (2002, 20) for the study of processes of Romanisation.

It is possible to create models for the archaeological material that can be referenced and, above all, can be tested. In the broad, multi-dimensional approach of conflict archaeology, elements of different research agendas are integrated. When shown in a diagram, a distinction can be made between a time-space dimension, an institutional dimension and a cultural dimension (Fig. 1.5). Obviously, modern conflict archaeologists are focused on events. This micro-scale can only be fully understood when it is compared and evaluated in a broader temporal and macro-regional context. In the institutional dimension, the role of power relations, social structures and the intertwined connection with the economic domain are considered. However, violent conflicts cannot be properly understood without taking the cultural dimension into account: the impact of ideologies, belief systems, identity constructions, and rituals. Unfortunately, it goes beyond the purpose of this study to discuss all these aspects.

Social and political elites have been using warfare as an instrument of power for a very long time. From the early 16th century up to the early 19th century, wars were fought with a dreadful regularity. As a result, Europe alone is already scattered with countless battlefields of varying sizes. If one only take the conflicts with the most far-reaching effect into account (in terms of population loss and destruction of infrastructure), the list would be very long indeed. However, although battlefields are a major area of research for conflict archaeology, the scope of this specialisation consists of far more than investigating battlefields and it is not synonymous with battlefield archaeology. Conflict archaeology focuses on conflict as a multifaceted phenomenon, with a variety of physical traces that possess multiple meanings that change over time. It is not restricted to battlefields or to large-scale wars between nations. The concept of conflict archaeology embraces other forms of conflict as well, such as industrial conflict, art historical analyses, protest activism, colonial conflict and cultural resource management, revealing the richness of the field. Its development as an important field of study is reflected in numerous publications, symposia and excavations, and the application of new methods and technologies. Ever since the establishment of the *Journal of Conflict Archaeology* in 2005, numerous papers have been published on various topics. A wide range of methods and techniques are available for conflict archaeologists, including forensic archaeology, systematic metal detection, historic landscape reconstruction, aerial photography and excavations, mentioned but a few. Conflict archaeology offers powerful new methodologies and theoretical insights into the nature and experience of (industrialised) war.

Unlike the United Kingdom, the Netherlands does not have a tradition in researching conflict sites archaeologically at an academic level. Although both WWI and WWII appeal strongly to the popular imagination, modern conflict had not been approached from an archaeological perspective to any great extent.
extent in Dutch academia until recently. Archaeology in the Netherlands is more associated with pre-modern eras and therefore has not developed much interest for 20th century violence at an academic level. In general, a lack of interest can be noted for military history and conflict archaeology. Archaeology of Roman Britain, for instance, is divided between the civilian south and the military north and west. This gap is hardly ever bridged. Despite its popularity among the general public, military archaeology is still unpopular in academic circles. For a start, military or conflict archaeology have acquired a poor standing among archaeologists since violence and its origins are regarded as distasteful research topics. Secondly, it is often argued that ‘we already know enough’ and that there is little left to research. However, as most notably demonstrated by the archaeological research of Douglas D. Scott conducted at Little Bighorn, Montana, United States, even an extensive available historical dataset can be proven incorrect.40

Despite the lack of an organised academic interest, several Dutch archaeologists started to record traces and features from WWII and to collect artefacts from this period from the 1980s onwards, albeit on an individual basis. Many scholars in the Netherlands were very sceptical about excavating and researching the material remains of this recent past. The total number of Dutch academic papers on this topic is still very limited, and the number of peer-reviewed academic papers on modern conflict archaeology (i.e. WWII) in the Netherlands can be counted on one hand: three so far, of which two were co-authored by the author of this study.41 On the other hand, the number of Bachelor and Master theses on this particular topic is steadily growing.42 The value and urgency of conflict archaeological research is also legitimised by the rapidly growing social interest in this subject. Increasing interest in conflict archaeological research into WWII is also notable. However, the development of a methodology and excavation skills are limited by laws and legislation in the Netherlands. Most strikingly, there are no clear (national) guidelines on how to deal with the remnants of this relatively young era.43

The past two decades have notably seen a growing interest for the heritage and remembrance of the war. ‘New’ heritage is discovered practically on a daily basis, for instance in the attic, through the discovery of archaeological remains, the digitisation of collections and the ever-growing body of oral histories.44 The Dutch Ministry of Health, Welfare and Sports,45 initiated the Heritage of War46 programme between 2007 and 2010, distributing a total of 23 million euros in grants among 221 projects for the preservation and accessibility of some of the most important material remains of WWII.47 The main goal of this programme was the digital disclosure of the dispersed collections. German remains were prospected and evaluated as well.48 Furthermore, a growing consensus can be perceived among various institutions for the integration of conflict archaeology, or to be more precise, WWII archaeology, into Archaeological Monuments Care (AMZ).49 According to national laws and legislation, everything under the surface is now part of archaeological heritage. However, not all eras are equally important, and archaeologists have to be selective. The Heritage of War programme also encouraged the development of policies with regard to this fragile heritage.50 However, the archaeological heritage of war or sites of conflict was hardly mentioned or discussed in the published report. For a very long time, the scientific perspective on WWII was dominated entirely by historians,51 and not much has changed since this programme was initiated. Archaeologists have an important task ahead of them, as they will have to introduce new perspectives and storylines.

41 Van der Schriek and Van der Schriek 2014; Wijnen et al. 2016; Van der Schriek and Beex 2017.
43 Van der Schriek and Van der Schriek 2014, 232-233.
44 Van der Laarse 2011, 33.
45 Ministerie van Volksgezondheid, Welzijn en Sport.
46 Erfgoed van de Oorlog.
47 Kok and Vos (red.) 2013, 3.
48 Arts 2017, 121; Leije and Hamburg 2014, 63; Zandhuis 2015, 9.
49 AMZ: Archeologische Monumentzorg.
50 Zandhuis 2015, 9.
51 Leije and Hamburg 2014, 63.
Sites of conflict are to be considered parts of landscapes of war in the widest sense. Former battlefields are stirring landscapes which are often transformed into symbolic spaces through pilgrimage, memorialisation and tourism. The ‘event’ of a battle leaves physical marks on a landscape (Fig. 1.6), while warfare has major psychological and physical impact on the people themselves. There is an important difference between conflict landscapes and conflict remembrance. On the one hand, the heritage of war is promoted by means of monuments and important anniversaries, and the cultural memory of war has been imprinted with and influenced by military cemeteries and monuments. On the other hand, the same era is largely ignored from an archaeological point of view. Only a handful excavations have been conducted on WWII conflict sites in the Netherlands and many important locations are still not legally protected in any way. Landscapes of memory are of great significance to our present-day world. What people remember and how it is remembered changes continuously, and history is often used to bolster particular political positions and to influence the public narrative. On the other hand, archaeology is not necessarily an a-political study. Due to its main role of truth-finding, archaeology has also become a tool for representation and memorialisation. With regard to findings from former WWII extermination camps, archaeology turns ‘rubbish’ into artefacts. According to Dutch cultural-historian Rob van der Laarse, archaeology is a performative act of cultural or even political significance, changing and shaping the traditional historical narrative.


Banks and Pollard 2018, 2.

Van der Laarse 2017, 144-147.
A main problem faced by conflict archaeology in the Netherlands is that modern eras, including both World Wars, have not received serious attention. As such, we must first determine the current state of conflict archaeology in the Netherlands. Chapter 2 delves into the historical background of conflict archaeology. Over the past decade, the study of conflict and war has emerged as a new sub-discipline of archaeology. Its key methodologies were developed in the United States as early as the 1980s, where specialised field techniques (such as advanced metal detecting) and methods for spatial analysis (like Geographical Information Systems) were explored to locate specific artefacts in order to map and reconstruct military strategies and other war events. These key methodologies are still in use today.\textsuperscript{55} I will argue that Dutch archaeologists need a different theoretical and methodological toolkit to be able to conduct conflict archaeology. Conflict archaeology not only produces detailed interpretations of battles and war events, but also traces and contextualises the individual historical participants in conflict situations.\textsuperscript{56} When applied and interpreted appropriately, archaeology can play an important role in the preservation, the contemporary experience and the historical reconstruction of recent conflicts. The aim of this study is to develop a Dutch approach to conflict archaeology, integrating archaeology, heritage research and history at a landscape scale. The focus of this study is on the challenges and limitations, but also on the potential of conflict archaeology. The value and urgency of this research is also legitimised by the rapidly growing social interest for WWII-related landscapes in the Netherlands, a war that still takes up an important place in Dutch collective memory and annual rituals of commemoration. However, research methods other than excavations will be needed.

This study will discuss the theoretical background of conflict archaeology, but this is not its principal aim. Much has been published on the rapidly changing theoretical paradigms that underly conflict archaeology, but the essence of this study is to be both an analytical and technical exploration of the potential of conflict archaeology in the Netherlands. Basically, there are no archaeological research questions available. The main research question in this study is: (1) Is conflict archaeology in fact possible, at any level, in the Netherlands? Further, (2) how can we identify sites of conflict? (3) How essential is the availability of historical sources and should they always be validated? (4) Do we need a special heritage policy for (modern) conflict-related sites? For many years, the archaeological remains of WWII found during excavations or construction works were regarded as curiosities at best and were exhibited as such.\textsuperscript{57} At the academic level, researching modern conflict archaeology is still a pioneering job in the Netherlands. Although older warfare will be addressed as well, the main topic is recent conflict. This study will not address any other research topics that are particularly popular at the moment, such as archaeology at sites of present-day conflict, e.g. the demolition of archaeological heritage in civil war-torn countries such as Afghanistan, Iraq and Syria.

WWI and WWII also raged on and beneath the water. Many ships, submarines and aircrafts sunk within Dutch territorial waters.\textsuperscript{58} The ocean floor is populated by about 7800 shipwrecks that were involved in WWII, with 3800 ships in the Pacific Theatre alone.\textsuperscript{59} However, underwater archaeology is outside the scope of this study due to the specialised methods and techniques it requires. Underwater archaeology is very different from archaeology on land and is therefore not included.

This research utilises an approach derived from the field of landscape archaeology, as conflict sites are to be considered cultural landscapes, influenced and shaped by man. As will be explained in chapter 3, landscapes are multi-vocal and multi-layered and accommodate a complex landscape biography. Landscapes of war never develop in an historical vacuum, but are always composed of and situated in landscapes with a long history. Hence, the historical backgrounds of local landscapes and trajectories of path dependence must also be taken into account in order to better understand the idiosyncratic nature,
functions and social implications of particular landscapes of war. This perspective can provide innovative new means of dealing with the material culture of conflict, heritage management and commemoration, and it is important that these archaeological monuments are not viewed in isolation.\textsuperscript{60}

In chapter 4, the state of the field is compared with that in other countries. This chapter has a descriptive character with a strong archaeological focus in order to reflect on international developments. How did conflict archaeology develop? What are the similarities and differences in approach and the narratives created in the various countries? This study is not meant for a Dutch audience only. Although the Netherlands is the main research field in this study, the arguments it introduces have wider significance. The material remains of WWII are unique compared to older eras due to issues of sovereignty, jurisdiction and ownership. Though Dutch excavation protocols and legal procedures are nation-specific, the challenges facing archaeological research with regard to modern looting through illegal metal detecting, the discussion on how to deal with these remains, and the ongoing improvements to applied conflict archaeology are of international importance. Ethics will be addressed in chapter 5. Most modern conflicts belong to living memory, and their investigation and presentation requires a sensitive touch. Conflict archaeologists are often confronted with political interventions, media pressure or unexpected reactions by local communities, and this study will ask how archaeologists should deal with such ethical questions.

In many countries, material culture is regarded as the main source of archeological information. In this study, the approach of entire landscapes of conflict is presented. As will be demonstrated in several case studies in chapter 6, the archaeological remains of modern conflict should not be studied in isolation. All cases adopt an explicit heritage perspective, assessing the availability, condition, management and presentation of relics that are still visible on or remain buried under the surface. This approach will present a broader perspective. Furthermore, the application of new techniques in the study of conflict archaeology is relevant for archaeologists worldwide, since methodologies in the field and the subsequent analyses are continuously evolving. How can proper choices be made? How can archaeologists assess the potentials and limitations of the different analytical methods?

With regard to the interaction of heritage, archaeology and spatial developments, this study can be regarded as fundamental research. For a relatively young specialisation, conflict archaeology has an impressive degree of interdisciplinary collaboration. It is expected that an applied multidisciplinary approach, which connects approved methods of conflict-archaeology research with new concepts for landscape archaeology, will be innovative and profitable for both international conflict archaeology and the Dutch research tradition itself. This field of study is prominently present in the media and is the playground for many new techniques and debates.\textsuperscript{61} This study integrates archaeology, heritage research and history at the landscape scale. In assessing and validating the added value of modern conflict archaeology for the Netherlands, it has also been a valuation study. Finally, by verifying and administering a non-invasive technique, it also includes methodological research.\textsuperscript{62} Light Detecting And Ranging (LiDAR) is a new tool for archaeologists that provides a convenient scale for delineation, management and protection of some (iconic) sites. When we look at complete landscapes instead of isolated sites, we see they are full of archaeological features, even though, individually, they would not have merited protection. The results, therefore, have implications for further research and preservation. Should there be a focus on iconic rather than average sites? In addition to the practical reasons for using LiDAR–based DEMs, such as their low cost, they are also an ideal way to avoid endangering any archaeologists in the field as well as to evade conflicting laws and legislation on the topic. It is important that a research agenda be drafted to preserve some of the key sites in the Netherlands. LiDAR can therefore be used as an archaeological prospecting tool to study forests and heathlands in particular.\textsuperscript{63}


\textsuperscript{61} Moshenska 2008, 161.

\textsuperscript{62} Cf. Witsen (ed.) 2014, 27.

Chapter 2 – Conflict archaeology

2.1 Historical background

Outside the Netherlands, conflict archaeology has grown at an exceptional rate and can be roughly subdivided into three main categories: prehistoric, historic and modern conflict. Archaeological research can therefore be applied to both ancient conflicts, like the Battle of Thermopylae (480 BC), and to modern conflict sites, such as the Korean War (1950-1953). What exactly to call conflict archaeology is still a subject of debate. When this distinct branch of archaeology was first practiced officially in the 1980s, it was defined as battlefield archaeology. Another common term is combat archaeology, which is restricted to immediate face-to-face combat and not warfare or warlike behavior over the long term. Both terms, however, are too limited.

The term battlefield archaeology is widely used in the Netherlands, and, misleadingly, it is also used for sites connected to conflict that are not battlefields per se, such as former concentration camps. Battlefield archaeology generally focuses on the archaeology of an event, like a battle, rather than the field on which it took place, as the term implies. Furthermore, the origins of conflict are of greater importance to battlefield archaeologists than military strategy. Conflict archaeology is a more inclusive term, which includes internment camps, concentration camps, and prisoner of war camps, among other non-battlefield topics, and will therefore be used in this study when referring to sites of conflict. However, a more fully refined archaeological vocabulary still has to be defined.

Conflict archaeology does not only address sites of conflict but also represents topics such as memorialisation, military training sites, field hospitals, prisoner of war camps and impact on civilian life. Conflict archaeology is often sub-divided into specific sub-fields, such as modern conflict archaeology, exclusively concerned with 20th-century conflict, military archaeology, which tends to avoid civilian aspects, occupation archaeology, Holocaust archaeology, bombsite archaeology and archaeology of internment, to mention just a few. The obvious consequence of these sub-divisions is further fragmentation of the field. These somewhat closed communities do not interact in any large extent and work according to their own standards. Although conflict archaeology is not an overarching term, it is still the preferred term at the moment. Conflict archaeology does cover the archaeological study of all aspects of mass violence, including the most ancient and the most modern conflicts and is not limited to battlefields. Conflict archaeology remains a distinct branch of the academic discipline and there is even a legal reason for its existence, as will be demonstrated in the following chapters.

Before battlefield archaeology or conflict archaeology emerged, the study of conflict was mainly practiced by military historians. However, seeing as archaeologists are uniquely able to study processes over

---

1 Pollard and Banks 2007, iii; Scott and McFeaters 2011, 104; Carman 2013, vii.
2 Carman 2013, 1, 10-11 and 94; Schofield 2005.
3 Sutherland and Holst 2005, 2; Scott and McFeaters 2011, 104; Sagona and Birkett-Rees 2016, 84; Wijnen et al. 2016, 23-24.
4 E.g. Logun 2015.
5 Moshenska 2008; 2009; Carr 2010; 2011; Myers and Moshenska 2011; Sturdy Coils 2012; Carman 2013, 8 and 10-12.
6 Bleed and Scott 2011, 47; Carman 2013, viii, 12 and 41-42.
the long term, we might want to answer the question of whether warfare is to be considered a process or an event. Violent episodes of the past can be studied very well by archaeologists.\textsuperscript{8} Evidence for warlike behaviour in prehistoric times depends on the archaeological record. Studies of historic conflict (usually battlefields) can consult the archaeological archive as well as written documents. Modern conflict archaeologists have access to both the physical material and textual evidence and can also refer to oral history, which may be the most efficient tool for understanding the individual experience of warfare.\textsuperscript{9} Of course, it must be used with great care – like any other historical tool. Details fade and memoirs will blur over time, but when it is combined with other sources, it can serve as an important window on the past.\textsuperscript{10}

Researches of prehistoric conflict and collective violence often have a social-anthropological focus on the nature of warfare rather than on its basic material manifestation. This perspective implies that the cultural behaviour of rival combatants can be identified through archaeological methods and theory. Evidence for collective violence in the Paleolithic is extremely rare.\textsuperscript{11} Historic battlefield studies, on the other hand, often have a strong link with military history. Historic eras are investigated with a much more linear narrative of cause and effect and usually offer a national perspective. Historic battlefield research is heavily focused on weapons used and patterns of deposition. Sites of historical significance are often identified and researched on the basis of historical data, like the Battle of Visby in Denmark (27 July 1361) or the Battle of Towton in England (29 March 1461). Conflict archaeology, of course, is not limited to historically recorded battles.\textsuperscript{12}

Traditionally, archaeologists are used to dealing with a long-term timescale. Prehistory is very long, historic time\textsuperscript{13} is a little shorter, and our own age is strikingly short in contrast.\textsuperscript{14} As stated by John Carman, conflict archaeology should “promote a wider, long-term understanding of how conflicts contribute to the structure and development of society and culture, and how humans respond to situations of threat and danger.”\textsuperscript{15} Apart from being divided along periods, conflict archaeology is also divided by geography and is often nation-specific, especially in the case of historic battlefields and modern conflict. This can limit the field’s prospects for development, and although efforts are made to give the study of conflicts a more international character, most research remains focused on a national level.\textsuperscript{16} Several British archaeologists have excavated sites related to WWI in France and Flanders, but this work was always limited to those areas where soldiers of the British Commonwealth fought. The WWII sites that were investigated are also exclusively linked with national identities. Even in studies of historic sites which were carried out by non-citizens of the state where the site is located, there was always a national connection.\textsuperscript{17} In March 2014, for instance, an archaeological study started near Hougoumont Farm at the famous Waterloo battlefield (18 June 1815).\textsuperscript{18} British archaeologists researched a site where British soldiers had fought and the project was partially funded by The Coldstream Guards, the regiment which was present at the site during the battle.

The media have played an important role in increasing the popularity of conflict archaeological research, as well as affecting a shift of awareness among professional archaeologists. For instance, the BBC funded a number of archaeological excavations which would never have been financed otherwise. Modern conflict archaeology definitely benefitted from these partnerships, but the needs of a television producer and

\textsuperscript{8} Wileman 2009; Scott and McFeaters 2011, 117; Carman 2013, 14.
\textsuperscript{9} Schofield 2005.
\textsuperscript{10} Wiest 2015, 9.
\textsuperscript{11} Scott and McFeaters 2011, 104; Carman 1997; 2013, 2-3 and 13-14.
\textsuperscript{12} Saunders 2002, 101; Scott and McFeaters 2011, 110; Carman 2013, 2-3 and 15.
\textsuperscript{13} ‘Historic time’ as a separate category between prehistory and modern day is not commonly used, but it is a very useful and legitimate concept for modern conflict archaeology, since this specialisation often provides snapshots of a (very) brief moment of time.
\textsuperscript{14} Bailey 1983; Murray 1999; cf. Banks and Pollard 2011, 130; Carman 2013, 79.
\textsuperscript{15} Carman 2013, 98.
\textsuperscript{16} Carman 2013, 2, 6, 15–16, 18 and 21.
\textsuperscript{17} Saunders 2001; Schofield 2005; Carman 2013, 20 and 60.
\textsuperscript{18} Archaeology@Waterloo 2014. Available at: http://tls509.wix.com/archaeologyawaterloo
archaeological best practices can clash. With regard to valorisation and reaching the wider public, archaeologists have to bear in mind that one can ‘popularise’ the main theme only to a limited extent, without distorting or sensationalising research. During a small-scale excavation on a WWI battlefield near Loos, France, British archaeologists encountered a field grave of a German soldier who was later identified as Leopold Rothärmel (*1892–†1915). He was a Catholic and part of the same regiment as Adolf Hitler, the 16th Bavarian Reserve Regiment. However, to make the broadcast more emotional, Rothärmel was ‘given’ a Jewish identity. Although the media are the best way to bring archaeological research into the public domain, the research aspect should never get lost in a desire to reinforce stereotypes.

But why do we need conflict archaeology? What issues in the highly diversified framework of contemporary conflict do conflict archaeologists work on? Like all other disciplines concerned with the past, the main goal of archaeology is to reconstruct and learn about human behaviour in earlier times. As such, one should also look at warfare, a much less researched topic. Many historians have been of the opinion that, thanks to traditional methods of research, such as the study of documents, memoirs, photographs and even film, we already know enough about (recent) armed conflicts and that further archaeological investigation is therefore unnecessary. However, in many cases this historical dataset has been expanded, or even been proven incorrect by archaeological studies. “Custer’s Last Stand” at Little Bighorn, Montana, United States, in June 1876, for instance, was not as heroic as history and popular culture had assumed, but was in fact very chaotic, as demonstrated by archaeological research.

Approximately 5,000 artefacts were retrieved at Little Bighorn, consisting mostly of cartridges and including only twelve arrowheads, contradicting all known depictions of the battle. Remarkably, human bones were quite unexpectedly the second major class of artefact found during the excavations. The U.S. soldiers were buried the day after the battle at the spot where they were killed and reburied in a mass grave in 1881. Still, disarticulated human remains of a minimum of 44 individuals were uncovered at the former battlefield during the first archaeological excavation in 1984. After an interpretation of the bones, it was concluded that they had been collected by untrained people. Small bones, such as hand and feet bones, had either not been recognised as human bones, or had simply been overlooked and left behind. The human remains also revealed poor dental health as a rule and widespread use of coffee and tobacco. This was the first time that modern conflict archaeology was put into practice. The excavation shed light on actual combat, post-battle activities, and battle-related depositions, and demonstrated the relevance of materiality in modern conflict.

In fact, modern conflict archaeology was born out of historical archaeology. For a long time, modern conflict archaeology was led by a small group of archaeologists and historians, both professionals and

19 Pollard and Banks 2007, vi-vii.
20 During WWI, about 100,000 Jewish men fought in the German Army who were just as patriotic as their non-Jewish comrades. Approximately 12,000 were killed during the war and about 30% were decorated. Around 2,000 officers were Jewish and the youngest German volunteer was also a Jewish boy. Josef Zippes was only 13 years old at the outbreak of WWI and lost both his legs on the Western Front. The 16th Bavarian Reserve Regiment contained plenty of Jewish soldiers, as demonstrated by historical sources. Hugo Gutmann (*1880–†1962), one of Hitler’s superior officers and responsible for recommending him for the award of the Iron Cross First Class is probably the most famous example. However, the most prominent soldier of the 16th Bavarian Reserve Regiment until 1933 was also Jewish: the painter Albert Weisgerber (*1878–†1915). At his time of death at Fromelles in northern France, Weisgerber was Adolf Hitler’s commanding officer. Hitler was assigned to the Regimental Head Quarter at this moment. Initially, Weisgerber was buried near the place he fell, but his body was later exhumed and reburied at the Nordfriedhof in Munich. After: Kershaw 2003, 144; Heijster 2006, 143; Weber 2011, 100-101.
21 Weber 2011, 121-122; Pollard and Banks 2007, viii.
22 Carman 2013, 10-12.
23 Van der Schriek and Van der Schriek 2014, 231.
amateurs, whose motives largely boiled down to personal interest, instead of the traditional spheres of development control or grant-funded research. Defining a goal for this new branch of archaeology was not simple. Should archaeology be used to fill in the blanks left by historians? Certainly, it would be much more satisfying if conflict archaeology aimed a little higher than simply striving to be an extension of the historical record. Should conflict archaeologists look at cultural patterns, human activities and behaviours associated with conflict instead? For long, conflict archaeologists had the tendency to adopt an empirical approach which focused on battlefields without considering the place of warfare within the wider social framework of those involved with it. Although there has been a long history of interest in the material remains of conflict, archaeologists have only starting making strides in the study of war and collective violence over the past three decades.

A broader perspective was first proposed by American historical archaeologists Haecker and Mauck in 1997, who suggested adopting an interdisciplinary approach, including both history and archaeology, in order to achieve a common goal: learning more about collective violence in the past. Over the past two decades, conflict archaeology has proved to be a powerful tool to illuminate human behaviour under the stress of battle. Troop deployment, firing positions and weapons used can be retrieved from the available archaeological data. Conflict archaeology has the potential to provide insight into the impact of warfare on civilian life and change present impressions of reality.

The American archaeologist Douglas D. Scott and his team managed to overturn a century-old myth in a study that inspired many European archaeologists. It was not only a powerful archaeological statement; it also proved the potential of this particular type of archaeology in the broader cultural landscape. The search for the dead, the detailed recording of scattered artefacts and combined topographic research brought battlefield archaeology to the attention of the wider public. For the first time, a technique was available for acquiring and analysing the deposit of conjunctures, the short-term event of a conflict. This research led to a clear understanding of the way the battle developed and pointed out some of the inaccuracies of the historical sources. This study underlined once more the value of archaeological research, proving that archaeology can present new story lines that differ from the traditional historical narratives told from a national perspective. Although the investigation of this iconic site was pioneering, provisional steps had already been taken earlier in the United Kingdom and France.

The origins of conflict archaeology can be placed in different historical settings and in various countries. The earliest attempt at conflict archaeology was probably made by writer and antiquarian Edward FitzGerald (*1809–†1883) in 1842 at the battlefield of Naseby (14 June 1645) in the United Kingdom. On mainland conflict sites such as Kalkriese (also known as the Battle of Varus, AD 9), Harzhorn (circa AD 235), both located in Germany, and Alise-Sainte-Reine in France (Alesia, the site where Julius Caesar defeated the Gallic tribes in 52 BC) were excavated in an early stage. The first excavation at Alise-Sainte-Reine was carried out in the 1860s, ordered by Napoleon III (*1808–†1873) to prove the strength and courage of the ancestors of the contemporary inhabitants of France. The aim of these excavations was not to use a broader theoretical framework or even to contribute to the broader theo-

---

27 Pollard and Banks 2007, iii and viii; Scott and McFeaters 2011, 105.
28 Pollard and Banks 2010, 415; Bleed and Scott 2011, 42; Wiest 2015, 8.
29 Haecker and Mauck 1997, 6; Scott and McFeaters 2011, 105.
30 Scott et al. 1989; Pollard and Banks 2007, xv; Scott and McFeaters 2011, 107 and 118.
31 Scott et al. 1989; Carman 2013, 7 and 45.
33 FitzGerald was most famous for his translation of some Persian poems, *The Rubáiyát of Omar Khayyám* (1859).
35 Rost 2007; Wilbers-Rost 2007; Callies 2011; Berger et al. 2013.
retical development of conflict archaeology. However, these excavations did make use of interdisciplinary methodologies, including the use of historical evidence, excavations, metal detecting (at Kalkriese and Harzhorn), material culture studies, (paleogeographic) landscape reconstructions, and spatial analysis. In paragraph 2.4, the German excavations will be discussed in more detail. The above-mentioned investigations of Roman-era battlefields in Germany and France developed almost independently from the Anglo-Saxon tradition of conflict archaeology, and rather have their roots in the continental tradition of Roman military archaeology. However, the excavation of the Little Bighorn site in the mid-1980s is generally accepted as heralding the emergence of modern conflict archaeology.

The American Civil War (1861–1865) is generally regarded as the first modern or industrial war. By means of archaeological research, conservators are also getting a better idea of which modern materials, such as metal alloys used in aviation and early plastics such as Bakelite, are preserved best in which soil conditions. Conflict archaeological research can also help to develop specific methods and techniques for research-focused battlefield analyses. Thus, archaeology can demonstrate its academic value as a mechanism to edit and supplement traditionally gathered historical data and by presenting stories in new narratives.

As demonstrated, the historical sources we have at our disposal cannot be trusted fully. They are often incomplete, show only one side of the story or do not mention a conflict at all that did occur according to the archaeological data. At Valencia, Spain, for instance, a mass grave of 177 French soldiers who were brutally murdered and mutilated in the Spanish War of Independence (1808–1814) was excavated in 1996. According to the only available historical account of the event, French soldiers were killed and buried in a riverbed. It never mentioned a mass execution of the enemy by civilians.

A more recent example of incorrect historical sources was provided by the study of South African military historian Garth Benneyworth and archaeologist David Morris. During the (Second) Boer War (1899–1902), British forces were confronted with an ongoing Boer resistance and guerrilla warfare. In order to smash the resistance, Lord Kitchener (\(1850-\text{†}1916\)) applied a systematic scorched earth tactic and concentration camp policy. The reprisals hit both Boer and African families hard and starvation threatened the rural population. However, African civilians were imprisoned in satellite camps, often located two kilometers from the Boer Camps, and received a much less nutritious diet. By July 1901 approximately 20,000 black refugees had been imprisoned. Kitchener decided that this group of prisoners did not only have to work and grow food for themselves, but also had to pay for it in order to bring down the costs of the campaign. Between Bloemfontein and Pretoria, 34 Black Camps were erected, including the Dry Harts concentration camp, which was rediscovered in 2001 and surveyed until 2006. It is unlikely that we will ever be able to accurately determine how many black civilians died in the camps, but British records show that a total of 600 people died in the camp between November 1901 and December 1902. However, a non-invasive archaeological survey at the cemetery of Dry Harts already pinpointed 1,700 graves, covering just three quarters of the graveyard, considerably more than the incomplete but official British death toll for the camp. These numbers suggest that the British under-recorded the death rate in order to conceal the horrible living conditions inside the camp.

In the Netherlands, the archaeology of 20th-century landscapes of war and conflict has not yet gained the full attention it deserves of the academic community. For long, Dutch archaeology neglected WWII as a field of archaeological research in itself. Until recently, the archaeological heritage of Operation Market Garden (e.g. at Arnhem, 17–25 September 1944) and of the Atlantic Wall, to mention just two examples, was the exclusive domain of amateurs and autodidactic experts on the architecture and

36 Roymans and Fernández-Götze 2018, 3.
37 The concept of industrialized warfare will be explained in paragraph 2.3.
38 Brand name for polyoxybenzylmethylenglycolanhydride, an early plastic.
40 Miquel-Feucht 2014.
41 Benneyworth 2006.
archaeology of bunkers. New building projects and other spatial developments at the former conflict sites of WWII were realized without taking into account the rich archaeological potential and heritage values of these sites and landscapes. This even remained the case after the implementation of the Valletta Convention in Dutch archaeology. The aim of this Convention (16 January 1992) is to protect the archaeological heritage as a source of the European collective memory and as an instrument for both historical and scientific study. In the Netherlands, a Monuments Law was created in 1961 which was revised several times. At first it was implemented that everything older than 50 years was automatically part of the archaeological archive and should be taken into account during excavations. In January 2012 this Law was revised once again in which was decided that the obligatory age of 50 years is no longer a requirement to be considered part of the archaeological archive. In theory also more modern eras can be considered 'proper' to investigate archaeologically but this revision has not led to a significant increase of conflict archaeological researches.

A decade ago, Dutch academic research had developed only a weak interest in the heritage and archaeology of landscapes of war, even though the popularity of WWII history grew rapidly in Dutch society as a whole, effectively obliging archaeologists to respond to this growing social interest. In this respect, Dutch archaeology also differed from archaeological practice and debate in other European countries, as will be demonstrated in chapter 4. As a result of this, professional archaeology and heritage management in the Netherlands faced a serious backlog in terms of academic knowledge and applied research. Although sites of conflict may seem to be just simple archaeological sites, they often turn out to be much more complex below the surface.

This gap in our knowledge means that, while there are a plethora of traditional archival data, objective information on the location of key battle events, for instance, is currently missing from our understanding of recent conflicts. The archaeological record needs to be regarded as an independent dataset, not as a mere supplement to historical sources. Of course, the archaeological record can be inaccurately interpreted as well, and data are only as objective as the archaeologist in charge. To illustrate this point, we can consider the ban on archaeological research in Israel’s West Bank and Gaza, since the colonial settlers are afraid that such research will provide evidence for the Palestinian claim by that its indigenous rights are more fundamental than the return of the Jewish people to their homeland. As was mentioned in the previous chapter, archaeology itself can be regarded as being of cultural and political significance, with the ability to change and shape accepted historical narratives. The historical record provides insight into just one aspect of a conflict, and archaeology can shed new light on the event in question. The physical features of a war are, in general, the only accurate and objective sources of information regarding what happened in a particular area. The archaeological archive beneath the surface contains information that cannot be found on photographs, films or in written sources. As discussed above, the material archive uncovered by archaeology can be a supplement to the historical sources or may even correct them. As such, restricted access to that archive is problematic and has the potential to mislead a wider community of researchers beyond archaeologists.

When aircraft crash sites are found (Fig. 2.1), it is not archaeologists but army specialists who investigate the event. Human remains are recovered by the Recovery and Identification Unit of the Royal

---

42 Van der Schriek and Van der Schriek 2014, 231.
43 In chapter 5, Dutch laws and legislation on heritage and archaeology will be discussed in greater detail.
44 Van der Schriek and Van der Schriek 2014, 229; Wijnen et al. 2016, 22.
45 Fraser and Brown 2007, 147; Saunders 2007, 159; Scott and McFeaters 2011, 117.
46 Weizman 2017, xviii.
48 Fox 1993, 326–327; Scott and McFeaters 2011, 116 and 121.
Netherlands Army (BIDKL). Obviously, they do not work according to archaeological protocols for recording features and context. Collaboration between archaeologists and the BIDKL, which is common in the United Kingdom and Belgium and led, for instance, to the identification of a series of lost servicemen by the Plugstreet Project and No Man’s Land, is strongly recommended. In summary, one can put forward the idea that, despite great social interest and involvement in this topic among the general public, the interest in the heritage of modern conflict in the Dutch academic world has been limited up to the present. This situation has resulted in a large archaeological deficit in academic research as well as in the pro-active maintenance and management of WWII heritage in the Netherlands. Even more seriously, illegal excavations have damaged many former sites of conflict in the Netherlands. In the area around Arnhem, for instance, battlefield tourism and re-enactment events are drawing more and more attention to the heavy fighting that took place in the area in the autumn of 1944. However, a drawback of this increased attention, which may, of course, also be beneficial by increasing tourist spending, is that it also attracts more treasure hunters. Over the past decade, Dutch archaeologists have started recording WWII-related excavations in greater detail, no longer identifying them simply as ‘recent disturbances’. Conflict archaeology can play a vital role with regard to the preservation of these features and artefacts.

---

50 BIDKL: Begrotings- en Identificatiedienst van de Koninklijke Landmacht.
This specific and distinctive branch of archaeology reveals history ‘from below’ and sheds light on the face of battle. Modern conflict archaeology provides snapshots of what was often only a brief moment in time. One should realise that the material evidence from conflict sites is the result of a complex series of events, often related to only a few days or even hours. Archaeology can play an important role in determining the contemporary experience of a former battlefield. The battlefield can be considered as the sharp end of war, where military doctrine becomes reality and narratives intersect with life and death. The study of WWII is actually at a critical juncture now. Veterans and civilians who participated in and lived through the war are passing away rapidly, and it will not be long until mémoire of WWII is totally replaced by histoire. As living memory fades, material heritage takes on more significance. Finally, archaeology can also play a role in the creation of new ‘memories’ of a conflict.

Archaeology has the unique ability to discover details of daily life that are often left out of personal journals and official histories. Individuals caught up in war will leave remnants of their actions. In the past, only those actions and proceedings were recorded which seemed of importance at the time. Some proceedings, constructing techniques and other actions were too obvious to record. For instance, even for more recent conflicts, such as WWI and WWII, we do not know much about burial practices for soldiers. The archaeological archive contains evidence for actual behavior during wartime, as well as symbolic representations of violence in a ritual context, such as iconography and grave goods. Military actions are marked by distinctive material deposits. Archaeological traces are distributed much more widely than the combat site alone, since preparations and investment are required before the actual combat begins. Archaeologists can distinguish between (1) pre-battle activities such as defense works, camp sites and ammunition depots, (2) actual combat sites, (3) battle-related (ritual) depositions such as mass burials, piles of armor, trophies and weapon deposits at cult places, like the famous Late Iron Age ‘trophy sanctuary’ near Ribemont-sur-Ancre, France, and (4) post-battle activities such as looting, cleaning and removal of bodies from a battle site.

Regarding mass graves, questions arise as who buried whom? What was the fate of the losers? We can consider, for instance, a mass grave that was discovered in Vilnius, Lithuania, in 2001 (Fig. 2.2). The soldiers of Napoleon’s Grande Armée that were found in the mass grave, dating from 1812, were buried quickly by the Russians, for hygienic reasons, and were not shown much respect. It was possible to determine the general health and age of the soldiers, which corresponded with the known recruiting practices at the time, but nothing specific about their social backgrounds was ascertained. However, it must be said that hasty burials are not necessarily a sign of disrespect, because the living and the dead were both on the frontline. The daily life of the common soldier was much less clearly defined than nowadays, but the archaeological archive lets us paint a better picture of the total situation. This information can lead to a completely different impression of daily life at conflict sites.

It goes without saying that not all conflict sites in neighbouring countries such as France and the United Kingdom have been investigated by archaeologists, and not every conflict site is appropriate for an archaeological research. Sites of conflict populated by soldiers for extended periods of time are more suitable for archaeological research than a battlefield that saw just one or two days of fighting. It is also possible to define the approximate size of a conflict site through archaeology. In almost all European

---

55 Wiest 2015, 8.
56 Pollard and Banks 2007, iv; Pollard 2008; Van der Laarse 2011, 33; Moshenska 2012; Damen and Koot 2016, 56.
59 Palubeckaité et al. 2006; Carman 2013, 54.
60 Sagona and Burkett-Rees 2016, 83; Robertshaw and Kenyon 2008, 16-18.
61 Rens 2004, 11.
countries, numerous sites, features and objects from both World Wars are still hidden below the surface, including materials ranging from human remains to ammunition, weapons, tools, personal belongings, and aircraft and vehicle wrecks (Fig. 2.3). In some places, the physical evidence of warfare is clearly visible in the landscape, for example in the form of trenches, concrete bunkers, craters and tank traps. All these remains should be considered as the material remains that form a landscape of warfare.62 The contribution of archaeology lies in studying the material culture of individuals in order to understand how they lived and died in these critical eras.63

2.2 ROOTS OF WAR: WARLIKE BEHAVIOUR IN PREHISTORIC TIMES

Conflicts between societies and mass violence between people are likely to be as old as humankind itself. Key questions in the archaeological debate concerning traces of violence include: What are the origins of war? History is based on archives or testimonials, but what does archaeology reveal about violence? Which methods are used and what are their limits? These questions and, above all, new developments have led archaeology to new fields of interest, involving forensic expertise, the retrieval of historical

62 Saunders 2007, 159; Scott and McFeaters 2011, 117; Sagona and Birkett-Rees 2016, 83.
63 González-Ruibal 2012, 472; Sagona and Birkett-Rees 2016, 83.
memory, and law. Conflict archaeology relates to the knowledge of war and the reality of violence; it
renews our understanding of war from prehistoric times to the contemporary era and challenges previ-
ously held ideas about warfare. Conflict archaeology is not the same as the study of warfare, as it also
looks at the wider social context, the consequences of war, and ritual and symbolic aspects. 64

In the 1990s, interest in prehistoric conflict was clearly on the rise. This may have been the direct
result of the return of warfare in the European theatre with the Bosnian War (1992-1995). The Srebrenica
massacre, for instance, destroyed the naïve illusion of a world without genocide after WWII. 65 Did war
exist among hunter-gatherer societies as well? It is very difficult to prove warlike behaviour in the past,
due to limited data, but it is certain that extreme violence has existed through time. 66 We cannot neces-
sarily label this violence ‘war’ sensu stricto, but it is evident that conflicts did occur. One should bear in
mind that during the Paleolithic, the world was much more sparsely populated than in later eras. When
do we call violence or a conflict ‘war’? Some scholars have suggested basing the definition on the death
toll relative to the total human population in a particular territory. This is difficult to determine, since we
can impossibly know how many people lived in a certain area for a given period of time in the Paleo-
lithic. However, archaeologists can look at a constant factor through the ages: mass graves. A mass grave
of people who died as a result of (extreme) violence in prehistoric times is not all that different from a

\[\text{Fig. 2.3. The remains of a British Brenn Gun Carrier near Loker, Flanders (Author).}\]

64 Bleed and Scott 2011, 42; Scott and McFeaters 2011, 119; McMahon et al. 2011, 216; Carman 2013, 80.
65 Armit et al. 2006, 3; McMahon et al. 2011, 216; Carman 2013, 8.
66 Scott and McFeaters 2011, 119.
mass grave of the Middle Ages or even WWII: relatively young, healthy men with severe trauma buried together in a disorderly manner. Mass graves can be evidence for nearby fighting, and in the past, several archaeological studies have focused solely on mass graves.67

In 1996, American archaeologist Lawrence Keeley published his pioneering study of collective violence amongst prehistoric tribes, *War Before Civilization*. For long, archaeologists had underestimated the impact of violence in pre-modern Europe, but Keeley argued that both archaeologists and anthropologists had largely pacified the prehistoric past and had ignored the widespread evidence of mass violence and warlike conduct, classifying all indications thereof as symbolic behaviour. In his book, he set up camp against the movement that claimed that collective violence and warfare did not arise until cities and empires emerged. This was certainly a remarkable conclusion, since almost all the earliest Egyptian, Greek, Roman and Chinese written sources describe warlike behaviour. Wars are often mentioned *before* or at the cradle of the earliest civilisations, for instance in the era of the (disputed) King Scorpion II (who lived around 3200-3000 BC), when Egypt was still divided into several minor kingdoms that fought each other. According to Keeley, the pacification of the past was a result of ignorance. Human remains had not been thoroughly investigated for cause of death, and archaeologists spent their days looking for fortifications in or nearby residential areas, whereas most of them were actually built at some distance from villages. In addition, archaeologists tended to be less than careful when determining the intended use of certain artefacts: were they used for hunting or for warfare? The archaeological record provides plenty of proof for conflict in prehistory in the form of defense structures, human trauma, evidence of destruction and weapons. Warfare, however, comprises much more than just formal battles.68

---

67 Carman 2013, 53; Van der Laarse 2013, 126.  
68 Keeley 1996, 3-4; Carman 2013, 6, 24 and 27.
When societies arise, violence increases, and post-war rituals are developed, as was demonstrated by Danish archaeologist Mads Kähler Holst and Austrian anthropologist Maria Teschler-Nicola at the symposium *Archéologie de la violence – violence de guerre, violence de masse.* At a lakebed near Vædebro, Denmark, approximately 2,100 bones were collected dating from the Iron Age (Fig. 2.4). The bones had been exposed for some time, before they were redeposited in the lake. Many of the skulls had been deliberately crushed and there was little trace of personal belongings. At the Asparn/Schletz site (5000 BC) in Austria, human remains of at least 67 individuals were found at the base of a ditch surrounding the settlement, all of whom had died as a result of extreme violence. Teschler-Nicola stated that the battlefield was never found, but it is important to note that archaeologists only excavated the settlement, and never actually went looking for a battlefield.

For long, archaeologists labored under the misconception that prehistorical societies were peaceful, neglecting evidence for warfare in the past. In fact, though, war is a kind of social organisation that contributes to the processes of social and cultural change. War is to be considered a particular form of social and political organisation. Since humans have populated the earth, unmistakable traces of violence can be detected on human remains. In Grimaldi, Italy, a dorsal vertebra of a child was found that had been perforated by an arrowhead between 34,000 to 24,000 years ago. At Gebel Sahaba in Egyptian Nubia, a mass grave was found with the remains of 59 men, women and children, all of whom had died as the result of extreme violence about 14,000 to 12,000 years ago. Some adults had multiple trauma and all the children had wounds in their head or neck, which are interpreted as execution wounds. In 2012, the remains of twenty-seven individuals were found near Lake Turkana, Kenya, dated 8000 BC, twenty-one of whom were adults. The group was a mixture of men, women and children. The articulate remains of twelve individuals were found in situ and ten of these individuals had clear trauma related to violence. The position of the two individuals with no evidence for peri-mortem trauma suggests that they may have been bound at the time of death. This study once more provided indisputable evidence for warfare among hunter-gatherer groups. Prehistoric warfare was not ineffective by definition. Most likely, special war tactics were employed in battles. The oldest proof of such tactics can be found in a cave near Morella la Vella, Spain, where one of a series of rock drawings depicts a group of archers. One group is outflanking another group, a tactic still used by militaries around the world. Obviously, prehistoric warfare was different from organised, large-scale modern wars. Keeley states that: “primitive war was not a puerile or deficient form of warfare, but war reduced to its essentials: killing enemies with a minimum of risk, denying them the means of life via vandalism or theft.”

Around 5000 BC, a massacre occurred in what is now the village of Talheim, Germany. In 1983, a mass grave was found with the remains of at least 34 individuals: eleven men, seven women and sixteen children. After they had been slaughtered, the victims were hastily buried. Some skulls were perforated by spears or arrowheads, whereas others were killed with axes. Forensic evidence showed that at least six different axes were used in this killing, all of which were slightly blunt, and had most likely been used primarily as a status symbol, whilst apparently also being very well suited to bashing in skulls. It is important to remember that symbolism has not disappeared from modern warfare, as can be seen from the mutilation of war casualties in WWII (mainly in the Pacific theatre of war) and the so-called ‘nose art’ on airplanes (Fig. 2.5). A prehistoric axe could have had multiple functions and meanings, but it clearly provides tangible archaeological evidence of murder. Due to this discovery, archaeologists were

---

69 Held at Lens, France, by the ‘Institut de recherches archéologiques preventives’ (Inrap), 2-4 October 2014.
71 Cf. Teschler-Nicola 2012.
73 Wendorf 1968; Keeley 1996, 3-4 and 37.
75 Keeley 1996, 175.
forced to step away from the idea of the ‘peaceful savage.’ Unlike other evidence, such as weapons and fortifications, human remains can preserve the actual marks of violent encounters in the prehistoric past.

Burial rituals and the location of a war grave often contain symbolism too. During the fierce fighting on the Eastern Front between 1941-1945, the soldiers of the Red Army were considered to be Untermenschen by the German Army and were therefore not treated in the same way as Germans. The Soviets did not treat their own dead with much respect either. This was a sensitive issue, because modern studies suggest that many more Red Army soldiers were killed during the battles on the Eastern Front than official figures showed. After WWII, the Baltic States were occupied by the Soviet Union (1922-1991) and for many (non-Jewish) locals, not Germany but the Soviet union functions as the main symbol of oppression. Today, German military cemeteries in those countries are located close to their own communal graveyards, while soldiers of the Red Army have been buried far away in desolate locations.

The oldest example of prehistoric violence in modern-day the Netherlands is a Bronze Age mass grave near Wassenaar. In 1987, this important site was discovered during a small-scale excavation ahead of construction works. The grave contained the remains of twelve individuals (men, women and children) and was dated around 1700 BC (Table 2.1). All had been buried at the same time and although the human remains were poorly preserved, it was established that all the individuals had been killed at the same time. The bodies had been buried according to careful rules, implying that they had been placed there by surviving relatives rather than a victorious opponent. The oldest men were placed in the center of the grave, and four younger men had been placed on either side of them. All men were buried

---

77 Miller 2014.
79 McMahon et al. 2011, 214-215; Van der Schriek and Van der Schriek 2011, 159.
80 ‘Inferior people.’
82 Van der Schriek and Van der Schriek 2011, 160; Van der Laarse 2013, 127.
with their faces upwards. In contrast, the women were buried with their face downwards. One woman (individual 11) was accompanied by a very young infant (individual 12). It seems that age and gender determined the position of deposition. There are several arguments in favour of the assumption that the individuals found in the Wassenaar grave died as a result of an armed conflict. First of all, the chest of one of the males (individual 10) contained a flint arrowhead. Trauma was also found on the bones of three other individuals. Not all violent deaths leave visible marks and some evidence may also have been lost because of the poor condition of the human remains. However, the skull of a young child (individual 4) as well as the left arm of a man (individual 3) were found separated from their respective bodies. It is likely that the individuals died during a violent conflict between neighbouring communities, in which traditional non-combatants such as women and children were also killed.\(^3\)

Mass graves like this have been found all over the globe. For the Netherlands, however, this grave is unique. Nevertheless, there is no reason to believe that this was a one-off conflict in Bronze-Age times. Prehistoric (mass) graves like the one at Wassenaar are usually archaeologically invisible: they are not marked by funeral monuments and do not contain any grave goods. Furthermore, human remains are usually not well preserved when buried under such circumstances. No fortifications of this era have been discovered (yet) in the Netherlands and, unlike other areas in Europe, the dead were rarely accompanied by weapons. Although there is not much evidence for the frequency of violent conflicts in prehistoric time, the few archaeological traces we do have indicate that conflicts formed a structural part of Bronze Age life in the Netherlands.\(^4\)

In the United Kingdom, several ditched enclosures were discovered and dated around 4000 BC. Not one of these was linked to warfare, not even when weapons and human remains were unearthed. When human remains were excavated, the enclosure in question was designated as a sanctuary or a place where deceased were exposed before burial. However, in some ditches, where palisades must also have been

<table>
<thead>
<tr>
<th>Individual</th>
<th>Age</th>
<th>Gender</th>
<th>Length (cm)</th>
<th>Trauma</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>20-30</td>
<td>Male</td>
<td>167</td>
<td>–</td>
</tr>
<tr>
<td>2</td>
<td>30-40</td>
<td>Male</td>
<td>182</td>
<td>Blow, lower jaw</td>
</tr>
<tr>
<td>3</td>
<td>30-40</td>
<td>Male</td>
<td>176</td>
<td>Blow, right humerus</td>
</tr>
<tr>
<td>4</td>
<td>3-3.5</td>
<td>–</td>
<td>–</td>
<td>Separated skull</td>
</tr>
<tr>
<td>5</td>
<td>30-40</td>
<td>Male</td>
<td>169</td>
<td>Blow, frontal bone</td>
</tr>
<tr>
<td>6</td>
<td>&gt;19</td>
<td>Female</td>
<td>170</td>
<td>–</td>
</tr>
<tr>
<td>7</td>
<td>15-16</td>
<td>–</td>
<td>Approx. 170</td>
<td>–</td>
</tr>
<tr>
<td>8</td>
<td>Approx. 10</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>9</td>
<td>&gt;22</td>
<td>Male</td>
<td>176</td>
<td>–</td>
</tr>
<tr>
<td>10</td>
<td>19-21</td>
<td>Male</td>
<td>177</td>
<td>Arrow wound</td>
</tr>
<tr>
<td>11</td>
<td>Approx. 18</td>
<td>Female</td>
<td>182</td>
<td>–</td>
</tr>
<tr>
<td>12</td>
<td>1.5-2</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

Table 2.1. Composition of the burial group at Wassenaar, the Netherlands (After Louwe-Kooijmans 2005, 460).

erected, ash was discovered. According to Keeley, a different interpretation of these palisades is also possible. At several similar sites, thousands of flint stone arrowheads were found, the largest concentrations of which were always located alongside the palisades and the gateways. Whatever the role of these enclosures might have been, some of them were clearly fortifications that were attacked by an enemy force.85

Urbanism is presumed to have originated in Mesopotamia in the later 4th millennium BC. Monumental architecture and economic diversification and specialisation at Tell Brak in northeast Syria are dated to the late 5th and early 4th millennium. Despite the lack of historical sources from this era, which rather complicates interpretations, warfare (or ‘warlike behavior’) definitely did exist. From the mid-1990s until 2009, several excavations and surveys were carried out at Tell Brak. The most recent discovery consisted of several mass graves dating between 3800-3600 BC, when the settlement was at its peak size of about 130 ha. These mass graves are a strong counterpoint to the dominant reconstruction of a peaceful prehistory in the region and are explicit evidence for violent conflict (Fig. 2.6).86

Approximately 450 metres north of the central mound of the settlement, several mass graves were discovered. The first mass grave was revealed in the autumn of 2006 after modern construction work,

---

and three more mass graves, together with several smaller deposits of human bones, were found during the excavations of 2007 and 2008. The two earliest and most complex mass graves are dated around 3800 BC.  

The largest mass grave contains at least 54 individuals, but it might be up to several hundred. The site was not fully excavated, and the density and thickness of the bones varied. The bones were mingled without any attempt to keep the parts of any given individual together, implying that the mass grave is a secondary context. Comparable with the study conducted at Little Bighorn in the 1980s, smaller bones were absent and probably lost during the gathering process and transportation to the burial site. However, the presence of two almost complete articulated skeletons is an indication that little time had passed between death and removal.

The grave was dominated by male adults (ca. 65% male and 35% female) in the 20–35 age class. This part of a population is least likely to die simultaneously as a result of disease, which means that violent conflict is the most plausible cause of death. It is believed that the violent event must have taken place near the settlement, due to the presence of several young children (aged 7–14 and 15–20). Violent deaths are typically indicated by visible trauma to the bones, but it was difficult, in this case, to distinguish peri-mortem trauma from damage as a result of decomposition and secondary deposition. However, at least ten skulls showed healed injuries sustained during previous violent encounters, in an era when clubs were the weapon of choice.

About one-third of this mass grave has been excavated. Amid and on top of human skeletal remains, animal carcasses were also buried. The animals were slaughtered and prepared in a short time and can be interpreted as evidence for a feast, most likely to celebrate a victory. The remains of 25 cattle and 100 sheep and goat skeletons were discovered, which would have provided enough meat for about 7,100 people, consuming 1 kilogram of meat per person over a three-day period.  

A second mass grave was created slightly later, but no more than a decade after the first event. However, the disarticulation of the human remains was much more extensive, animal bones were almost absent and the mixture of age (a higher proportion of children) and sexes was also very different (68% female to 32% male). These bones represent a primarily traditional group of non-combatants and indicate the presence of at least 89 individuals. The archaeological evidence can be interpreted as a cemetery clean-up, and the cause of death can be assumed to be a second violent event. Remarkably, a total of 42 tools made of human bones were also recovered from this grave, which had been both manufactured and used on the spot. It is likely that they were used to create trophy skulls, since several polished cranial fragments were also found in the grave.  

A third mass grave was partially excavated and was found to contain the remains of at least fourteen individuals. In addition, a large pile of disarticulated bones was found, along with another mass grave containing at least 35 individuals. Without doubt, the above-mentioned mass graves constitute evidence for organised mass violence. All the excavated graves consisted of a mixture of combatants who had been killed in action and massacred bystanders. The disregard for the preservation of individual bodies, as well as the symbolic tool-making, suggests that the dead were enemies. Human bone is structurally less strong than animal bone and therefore unlikely to have been the preferred material for functional tools. These bone tools are strong evidence for a ritual element of warfare; the use of human bone for tools should be regarded as a symbolic act. The trophy skulls produced with these tools could be considered as a status symbol or as a token of further humiliation of the defeated enemy.

The mass graves of Tell Brak were deliberately covered with mounds of rubbish, which were designed to be seen from a distance. The piles were maintained for at least five generations and can be regarded as a
‘creative’ act associated with warfare. The nature and the locations of the violent events remain unknown, but they probably occurred nearby. For logistic and commemorative reasons, mass graves, both prehistoric and modern, are never far from the battlefield.93

In 1991, an ice-mummy was found in the Ötztal Alps on the present-day border between Austria and Italy. It turned out to be the body of a well-preserved man who died in the Bronze Age. The mummy was nicknamed ‘Ötzi’, as a reference to the place where he was found. Radio-carbon dating revealed that he must have lived around 3150 BC. Ötzi was aged 45 when he died which was quite an advanced age for that era, and was approximately 1.65 metres tall. Palynology indicated that he had been in a different valley further south twelve hours before his death. In his last hours, he climbed to an altitude of 1,200 meters. What was he doing there? Some scholars believe he must have been a shepherd or a trader, whereas others concluded that he was a tribal leader, as his copper axe and bearskin hat are indications of a higher status in Bronze Age societies. A first, however, nobody suggested that Ötzi might have been a warrior.94

At an early stage of the examination of the body, an Italian researcher pointed at a wound on his left shoulder, possibly the result of a projectile. This possibility was immediately firmly disputed, although scholars, ideally, should be willing to consider multiple explanations. For long, the general assumption was that Ötzi died in a storm while hunting. This begs the question: what was he hunting for? It is unlikely that a hunter would have found any serious game at that altitude. Years after (!) the discovery of the body, several X-ray photographs were taken, and an arrowhead was detected in his left shoulder. The arrow cut through a vital artery and Ötzi must have died within minutes due to heavy blood loss. In addition to this mortal wound, he also had cuts on his right hand and his forehead. Traces of blood were detected on both his clothes and weaponry. Four different types of DNA were detected: on the knife blade, two more on an arrowhead and a fourth on his goatskin coat.95 These are all strong indications of a violent death.96

Recent research into fortifications, weapons and human remains has yielded much new information on violent deaths in European and American pro- and prehistory. Anthropological research amongst present-day hunter-gatherer societies in Australia, the Kalahari Desert and the northwest coast of America support the idea that our prehistoric past was more violent than was suggested at first. According to this comparative research, at least 25% of the total male population died in battle or as a result of extreme violence, and practically every other man had battle scars on his body.97

The origins of war are controversial and remain disputed. Evidence for the relationships between prehistoric hunter-gatherer societies is scarce and most models are based on analogies with modern-day hunter-gatherer societies. In the past, warfare was thought to be less effective, more ritualised and focused on status, prehistoric conflict was certainly deemed to differ from modern warfare, and massacres were often assumed to be the result of raids for resources (women, children, food).98 Nowadays, the conviction is growing that collective violence had a more prominent place in everyday life and that archaeologists have offered too little space for war in their narratives. Warfare formed an integral part of social life in prehistoric times.99

---

93 McMahon et al. 2011, 216.
96 However, this explanation of a violent death is still not commonly accepted. In 2006 an article about a genetically research appeared in the American Journal of Physical Anthropology. According to this paper Ötzi might have had reduced sperm mobility and was therefore an outcast of his community. After: Rollo et al. 2006, 561.
98 Keeley 1996, 29 and 175; Carnan 2013, 23; Mirazón Lahr et al. 2016, 394 and 397; Roymans and Fernández-Gótz 2018, 3.
2.3 Basic Principles of Total War and Modern Warfare

War is complex, and through the centuries, the character of war has changed continuously. With the rise of the Roman Empire, war was used both to gain and control new territories. Interregional warfare increased dramatically along with Roman imperial expansion. In a later phase, war was used to protect the limes, the border of the Empire. In the following centuries, war remained an important source of income for the nobility. War operates on several scales and has an impact on societies in several ways. All wars result in a dramatic shift in human behavior, but industrialised conflict truly embodies the extremes: from production and mobilisation of a nation to injury, loss and despair at an individual level.

The American Civil War (1861–1865) is generally considered to be the first industrial or modern war. Some characteristics of industrial warfare include mass-conscripted armies, rapid transportation (first on railroads, then by sea and air), telegraph and wireless communications, high explosives and other industrially produced weapons. WWI was the first global industrialised conflict, and because several nations wanted to end conflict as soon as possible and prevent endless slaughters, as seen in WWI, they developed weapons of mass destruction which could change the landscape even more tremendously. As early as 1921, Italian General Giulio Douhet (*1869–†1930) predicted that the next war would be seen an unequalled level of destruction. New conflicts should be fought quickly, without compassion or sentimentality, and regardless of whether or not the means were forbidden by international treaties: “War has to be regarded unemotionally as a science, regardless of how terrible a science.” Paradoxically, Douhet believed that future wars would become more humane, despite the increasing horrors of war, because he expected that destructive weapons would force a decisive victory at an early stage of the hostilities and therefore shorten the conflict.

The inclusion of entire populations and their economies in warfare is known as Total War. In this situation, the opposing forces are willing to make all necessary sacrifices, both in terms of human lives and resources, during military conflict. The differentiation between combatants and non-combatants diminishes and all civilian resources and infrastructure are considered legitimate military targets. A Total War is unrestricted in terms of which weapons are used, the territory on which war is waged, and the combatants that are involved. When wars were decided by armed forces alone (that is, only small parts of a nation’s resources) on distant battlefields, the effects of war were only felt by relatively few civilians. Total War, on the other hand, exhausts all the resources available to a nation and sees all of society join the war effort: the men with weapons at the front, the women in the ammunition factories, the farmers growing crops, and the scientists in laboratories.

Total Warfare is clearly distinguishable from earlier, ‘limited warfare.’ The famous Prussian General and military theorist Carl von Clausewitz (*1780–†1831) developed the theoretical concept of Absolute Warfare in his major work Vom Kriege (On War), which was published posthumously in 1832. The concept of an Absolute War was highly influenced by the new way of warfare, which was introduced by the French Revolution (1789–1799). Von Clausewitz rejected the limited objectives of 18th-century warfare, in which local military victories were regarded as the key to advantageous diplomatic negotia-

---

100 Lindgren 1993, 9; Roymans and Fernández-Götz 2018, 8.
103 Miller 2014, 56.
104 Douhet 1921, 196.
105 Douhet 1921, 189; Miller 2014, 56–57.
108 Miller 2014, 57–58.
tions. In an Absolute War, the opponent’s military and industrial resources had to be crushed completely by force of arms: “War therefore is an act of violence intended to compel our opponent to fulfill our will.”¹⁰⁹ The terminology ‘Absolute War’ is often confused with Total War, but the latter term does not appear at all in Von Clausewitz’s work. The origins of the phrase Total War can be traced back to the publication of the WWI memoirs of the German General Erich Ludendorff (*1865–†1937), *Der totale Krieg* (The Total War), but was made famous by the Total War speech¹¹⁰ by German Minister of Propaganda Joseph Goebbels (*1897–†1945), held at the Berlin Sportpalast on 18 February 1943.¹¹¹ Total War, however, is not a 19th-century invention. In fact, it has been practiced for centuries. The first documented Total War was the Peloponnesian War (431–404 BC); the fighting lasted for years, the economic resources of participating city-states were consumed and entire populations were executed or sold into slavery. The Thirty Years War (1618–1648) can also be considered a Total War. All major European powers were involved and each of their economies was based entirely on the war. The size of armies grew, plundering was an accepted method of paying and feeding an army and the civilian population was ravaged. In the 19th century, the concept and definition of Total War changed, due primarily to industrialisation and, additionally, the mechanisation of warfare.¹¹² Twentieth-century warfare literally changed the landscape (Fig. 2.7) and even had an impact on the (global) environment. On the former WWI battlefields in Flanders, for instance, the amount of iron in the soil created a geological ferrous layer of about one metre thick.¹¹³ WWII and the Cold War (1947–

¹⁰⁹ Von Clausewitz 1997, 5.
¹¹⁰ *Sportpalastrede.*
¹¹¹ Cf. Longerich 2015.
¹¹² New World Encyclopedia 2015; Conn 1968.
1991] also had far-reaching effects on landscapes. Between 1945 and 1988, over 500 nuclear bombs were detonated all over the world, at an average rate of one every 9.6 days. The worldwide fallout is easily recognisable in the chemo-stratigraphic record. Some geologists even suggest defining the beginning of the Anthropocene with the detonation of the very first atomic bomb on 16 July 1945.114

As discussed, WWI can be considered the first global, industrialised Total War.115 The word ‘total’ does not refer to the extent of destruction, but to the range of acceptable targets and means. Although there is no single definition of Total War, characteristic elements are blockades (e.g. the Allied blockade of Germany during and directly after WWI), strategic bombing, a no-prisoner policy, scorched earth policy, executing civilians as a means of collective punishment, deliberate inclusion of civilians as legitimate military targets, unrestricted submarine warfare and the use of civilians and prisoners of war as forced labour for military operations.116 Since the end of WWII, no industrial nation has fought a large-scale, decisive war. Nuclear bombs were (and still are) deterrent weapons, as the complete destruction they cause would reduce the advantages of a victory to zero. Some consider the Rwanda genocide (1994) and the War in Darfur (2003–2011) as more recent examples of Total War.117

War itself is already difficult to define but can by characterised as “socially organised armed combat between members of different territorial units (communities or aggregates of communities).”118 A full definition of the word ‘war’ is described in most dictionaries as:

1 A (1): a state of usually open and declared armed hostile conflict between states or nations; (2): a period of such armed conflict (3): state of war
   B: the art or science of warfare
   C: (1) obsolete: weapons and equipment for war; (2) archaic: soldiers armed and equipped for war
2 A: a state of hostility, conflict, or antagonism
   B: a struggle or competition between opposing forces or for a particular end <a class="" war""> <a class="" war""> against disease>119

As described in paragraph 2.1, we can distinguish three types of warfare (prehistoric, historic and modern conflict), each with its own characteristics and set of archaeological evidence.120 As stated in the previous paragraph, not a single war is ever fought without some explicit or implicit goal. At Tell Brak, for instance, there is a strong temporal correlation between the mass graves and the expansion of the settlement.121

Conflict archaeologists have no interpretative framework to link the very diverse sites and material culture that form the archaeological record of warfare. However, it is not necessary to develop a whole new array of theoretical concepts, since modern military planners have already developed such models for conceptualising the range of action involved in warfare.122 In the U.S. Army Field Manual 100-5 (1994), modern war is characterised by the following basic principles: (1) Objective. Direct every military operation towards a clearly defined, decisive and attainable objective. (2) Offensive. Seize, retain, and exploit the initiative. (3) Mass the effects of overwhelming combat power at the decisive place and time. (4) Economy of Force: Employ all combat power available in the most effective way possible; allocate minimum essential combat power to secondary efforts. (5) Place the enemy in a position of disadvantage through the flexible application of combat power. (6) For every objective, seek unity of command and unity of effort. (7) Security. Never permit the enemy to acquire an unexpected advantage.

114 Zalasiewicz et al., 196 and 200-201.
117 New World Encyclopedia 2015.
119 Merriam-Webster 2016.
120 Carman 2013, vii.
121 McMahon et al. 2011, 217; Scott and McFeaters 2011, 118.
122 Bleed and Scott 2011, 42 and 48–49.
(8) Strike the enemy at a time or place or in a manner for which he is unprepared. (9) Prepare clear, uncomplicated plans and concise orders to ensure thorough understanding. The above-mentioned principles of modern warfare are very broad and they change and vary from one location to the next. What is common in one era can be absent in another time or place. Principles of warfare reflect the humanness (or contrary, inhumanity) of a conflict and have an effect on the archaeological record.

Spatially, a so-called ‘battlespace’ includes an area of operations, an area of influence and an area of interest (Fig. 2.8). The area of operations is occupied by a combat force, an area for which a commander is responsible. The area of influence can be directly influenced by manoeuvres or fire. The area of interest is controlled by an opposing force and is relevant to a commander’s mission. These three areas are more or less geographically spaced and can be detected in the landscape, since they tend to occupy specific places and exhibit certain features. Within the battlespace, material facilities such as home stations (permanent bases from which combat forces are mobilised), logistics, depots and defence structures can be distinguished. Borders within the battlespace can be physical and manmade (like the Berlin Wall or the Israeli walls in the West Bank and Gaza), but, usually, they consist of an interaction of individuals and their environment (like a mountain range or a desert). A battlespace can also be influenced by sealing off areas, for instance by constructing defence works or by blocking roads, thus changing the topography of a battlespace. In present-day military situations, home stations are often removed from the area of operations, but in the 19th and 20th century, they were often inside this area. The locations of these home stations can be used for terrain analyses, as will be explained in the next paragraph.

One of the most prominent aspects of modern war is its scale. According to the British archaeologist John Schofield, modern war is: “typically extended beyond the confines of a discrete battlefield, first to take in (and ultimately take out) the entire landscape, extending to a global scale and impacting on everybody, however far from the frontline they may be.” For long, conflict sites were considered unapproachable by archaeologists. One of the main problems was their sheer size; battlefields can cover hundreds or even thousands of acres. Battlefields from earlier eras only occupy a limited portion of a landscape, and the armies were relatively small in size and deployed non-industrial weapons on a modest scale. Modern war is characterised by vast territories, battles fought over weeks, months or even years by huge armies that use mass-produced weapons on a massive scale. Entire landscapes are transformed; from trenches in the frontline to internment camps and weapon factories in the rearguard.

Archaeologically, three different types of warfare can be distinguished: (1) small-scale warfare (raiding) versus large-scale warfare, (2) pre-industrial warfare versus industrial warfare and (3) open field battles versus

---

124 Dunlap 2006, 42.
125 Weizman 2017, 203.
126 Bleed and Scott 2011, 51-52 and 61; Scott and McFeters 2011, 114.
sieves of defended sites. Furthermore, a division can be made of two basic types of battlefields, namely siege and open field. Distinctive archaeological features of a siege are fortifications, artillery positions, long-term camps and extensive trash deposits. On open field battlefields, temporary breastworks can be found, parts of uniforms, spent cartridges, (live) bullets and artillery shells.\textsuperscript{129} The German archaeologist Michael Meyer proposed a further distinction between a skirmish, a battle and a conflict landscape. A battle is usually well organised and fought between (large) armies. Battles are usually planned, (large) armies are involved and they are commonly part of a longer campaign. A skirmish is of a much smaller size and often not planned. Both are spatially limited and considered to be events. Conflict landscapes, on the other hand, are spatially wide and include the battlespace, fortified sites, strategic views on the landscape, army camps and so on.\textsuperscript{130} These different scales of war present archaeologists with a range of technical and interpretative challenges.\textsuperscript{131}

2.4 MODERN CONFLICT ARCHAEOLOGY: METHODS AND TECHNIQUES

Winston Churchill (*1874–†1965), Prime Minister of the United Kingdom from 1940 to 1945 and again from 1951 to 1955, suggested once that the sites of battles are ‘the punctuation marks of history.’\textsuperscript{132} The initial English Heritage Battlefield Inspector, Andrew Brown, added that: “If battles are the punctuation marks of history then battlefields are the fragmentary pages on which those punctuation marks were written in blood.”\textsuperscript{133} Historians are usually not involved in the process of classifying heritage. War, however, is an important and distinct category.\textsuperscript{134} Archaeology, as a discipline, plays an important role in authenticity claims, as will be discussed in more detail in the following chapter. Tangible artefacts from a gone by era will best capture the past for the general public, and archaeological excavations make it possible to bridge the gap between past and present. Modern conflict archaeology can also be very useful to either validate or invalidate popular urban legends and myths that live on in our collective memory, such as the case of Little Bighorn mentioned before or the search for Alain-Fournier (*1886–†1914).\textsuperscript{135} The latter study will be described in chapter 4.

Archaeological features can only be consulted intrusively once; afterwards this source of information is destroyed. At some sites, artefacts simply rise to the surface, after which the best of these artefacts are taken by treasure hunters or even casual visitors. Even if an artefact subsequently ends up in a museum, the context of the find is not documented. In orthodox archaeological excavations, on the other hand, the context of an object is the most important source of information. Numerous studies have made clear that modern conflict archaeology, its methods, techniques and theories are also relevant for older historical and prehistorical eras.\textsuperscript{136}

There are two main drivers for studying phenomena of conflict, namely the issue of remembrance and the importance of highlighting the horrors committed during a war, as perpetrators of said horrors often try to cover up their crimes, for instance at Treblinka or, more recently, in Bosnia.\textsuperscript{137} Conflict archaeologists can play an important role in answering the following questions: Where did the violence take place? How did the victims die? Who died, friend or foe, combatants or non-combatants? The methodological toolkit of conflict archaeologists includes metal detecting, Geographical Information Systems (GIS), spatial analysis, forensic archaeology, historical sources and oral history. GIS and other technologies can

\textsuperscript{129} Scott and McFeaters 2011, 118-119.
\textsuperscript{130} Berger \textit{et al.} 2013.
\textsuperscript{131} Bleed and Scott 2011, 43.
\textsuperscript{132} Churchill quoted in English Heritage 1995, 1.
\textsuperscript{133} Brown quoted in English Heritage 1995, 1; Sutherland and Holst 2005, 12.
\textsuperscript{134} Adam 2006, 7.
\textsuperscript{135} Pollard 2002, 131; Todman 2005, 209.
be very useful to integrate history and archaeology for synthesis and interpretation. When incorporating
documentary records, contemporary maps and artefacts recovered during a metal detector survey into
a database, a spatial analysis will provide a more complete picture of the events than either history or
archaeology individually.\textsuperscript{138}

In 2015, an important archaeological expedition, which combined metal detecting surveys and oral
histories, was started by French Roman Catholic priest Patrick Desbois near Rawa-Ruska, a border town
between Ukraine and Poland and the location of several execution sites of Polish Jews. Hundreds of car-
tridges were located by means of a metal detector, with Desbois stating that each bullet found represented
a Jewish victim. Moreover, the expedition prompted locals to start talking about their war experiences.
The Jews who had been massacred were no strangers, but friends and neighbours: people still knew the
victims by name. In this case, the artefacts were not only an important clue to locate the graves, but also
a means to recover memories.\textsuperscript{139}

The impact of conflict-archaeological research should not be underestimated, as it can even change
current political attitudes. During the Spanish Civil War (1936-1939), at least 50,000 people were killed
by the Socialists and approximately 100,000 by the Falangists. After the victory of General Francisco
Franco (*1892-†1975), most victims were deliberately ‘forgotten.’ As an act of reconciliation, Franco
ordered that Republican victims also be interred in the Valley of the Fallen,\textsuperscript{140} but they were given
unnamed graves. Over 88,000 persons from this era are still missing, and only Cambodia now has more
missing persons, as a result of the Khmer Rouge regime (1975-1979). Spanish archaeologist Alfredo
González-Ruibal, for instance, is trying to revive public memory. Remnants of the Spanish Civil War
proved to be plentiful and ubiquitous and showed another version of the past. As a result, the general
opinion that ‘it was not all that bad’ during Franco’s regime (1936-1975) shifted, when the excavations
brought the many horrors conducted during Franco’s rule to light.\textsuperscript{141}

After the civil war, about a million Republican soldiers were interned in the more than 100 concen-
tration camps erected across the country. During an excavation conducted in 2010 by González-Ruibal,
GIS was used to map the concentration camp of Castuera in a remote and desolate area of Extremadura.
Castuera was constructed in April 1939, before being dismantled a year later. Approximately 15,000
people passed through this camp, and an unknown number died here during their detention. In 2011,
arkeologists recovered a mass grave nearby, which contained the human remains of 18 individuals who
were executed at the spot. The GIS survey also revealed other grim aspects of the camp’s history, dem-
onstrating how severely the prisoners were humiliated with surprising accuracy. The latrines, for instance,
were located in a remarkable place, visible from everywhere in the camp and the surrounding area (Fig.
2.9). According to the orders issued by the concentration camp service, the latrines should be at least
250 metres away from the campsite, be at least 2 metres deep and no more than 1 metre wide. In reality,
the latrines were less than 30 metres away from the campsite, only 20 centimetres deep and more than
2 metres wide, which made them very unhygienic and increased the chance of diseases. Above all, the
prisoners were visible from all sides while using the latrines: from the living area, the working area, and
even to outsiders. Looking at the campsite as a whole showed that the camp was visible but inaccessible
for people outside, which had an odious effect. The public knew that horrible things happened ‘over
there’, but they could not see exactly what. The archaeological investigation underlined the accounts of
Castuera as a place notorious for its inhuman repression.\textsuperscript{142}

Archaeological excavations make it possible to show history to present-day generations in a recognis-
able, individual way. From its beginnings, the study of conflict has been of great interest to the wider

\begin{thebibliography}{9}
\bibitem{Nettelfield2010} Nettelfield 2010, 96; Carman 2013, 75; cf. Sturdy Colls 2012.
\bibitem{Nolan2009} Nolan 2009, 81.
\bibitem{Desbois2009} Desbois 2009, 54 and 56; Van der Laarse 2013, 124.
\bibitem{GonzalezRuibal2007} González-Ruibal 2007, 26 and 457; Carman 2013, 68; cf. Ferrándiz 2013.
\bibitem{GonzalezRuibal2012} González-Ruibal 2012, 464 and 466–467.
\end{thebibliography}
public. Tangible artifacts of war will capture the interest best and will allow for a broader understanding of 20th and 21st-century war. By placing these violent events of warfare within their wider social context, conflict archaeology demonstrates its academic value. Twentieth-century conflict sites and their related material demand a specific archaeological approach. Compared to previous wars, modern war is much more drastic and destructive, as outlined in paragraph 2.3. It is legitimate to consider modern war a unique phenomenon, distinct from wars waged in other, earlier eras.

Essentially, excavations are carried out in line with the ‘classical’ methods. Prior to the excavation, desk-based research is conducted. Archives and contemporary maps are consulted, but oral history, if available, can also be of importance, e.g. in the case of an excavation on a WWI battlefield, craters are excavated and features are sketched. Afterwards, the features are excavated completely and artefacts are collected, registered and numbered. Following this process, archaeologists will start looking for older features underneath.

---

Fig. 2.9. The Geographical Information Systems (GIS) study at the concentration camp of Castuera revealed the level of humiliation to which the prisoners were subjected with surprising accuracy. The Catholic cross was part of a relentless process of the re-education of the Republican prisoners. (After Gonzáles-Ruibal 2012, 465. Modified by the author).

---

143 Scott and McFeters 2011, 110.
144 Rens 2004, 7 and 11; Saunders 2004, 5; Carman 2013, 87.
A key methodology applied by English landscape archaeologist Glenn Foard is historic terrain reconstruction. One must bear in mind that landscape affects every single conflict. Since historical accounts can be highly misleading when it comes to the present-day appearance of a landscape, topographical research is of the utmost importance for a detailed reconstruction of a historic landscape. The deployment of troops on a battlefield was inextricably connected to the type and use of the landscape. Foard outlined three stages: (1) reviewing the topography based on written sources, (2) reconstructing the landscape by means of surviving documentary sources and remaining material evidence and (3) creating an archaeological survey programme to reconstruct an estimated model of the landscape at a particular date. Historic terrain reconstructions conducted in the United Kingdom made it possible to identify areas that were poorly suited to troop formations distinctive of a particular era, such as cavalry or musket-armed infantry, which forced researchers to rethink the archaeological disposition. Terrain analysis, where the archaeological record is combined with a cartographic study, enables one to begin to interpret the archaeological evidence of a conflict site.

When looking at a conflict zone, it is important to consider that each landscape requires different strategies and tactics, which influences the archaeological record. At Kalkriese, Germany, the site of the famous Battle of Varus in AD 9, osteological material was found in a mass grave. A mixture of both human and animal bones suggested that the battlefield was cleared sometime after the actual combat. The archaeological evidence suggested that the deceased had first been looted and were then left behind.

Fig. 2.10. The distribution of metal-detected artifacts recovered at the Little Bighorn battlefield. The boundary areas show the metal-detected inventory areas (After Scott and McFeaters 2011, 108).

---

146 Cf. Carman 2013, 44 and 53.
148 Foard 2008, 26; Scott and McFeaters 2011, 115; Carman 2013, 50–51.
to decompose.\textsuperscript{149} At the Little Bighorn battlefield in the United States, on the other hand, the identification of individual rifles allowed researchers to trace the movements of those firearms about the field of battle (Fig. 2.10), thus providing information on the behavior of individual combatants within a narrow temporal context of about 60 to 90 minutes. This spatial analysis made it possible to reconstruct the sequence of events. After a close analysis of the findings, it turned out that the Native American warriors used the terrain much more effectively, which was later also proven by GIS research (Fig. 2.11). General George Armstrong Custer (1839–†1876) and his men of the 7th Cavalry Regiment were outnumbered, outgunned and outfought by their Lakota and Cheyenne opponents.\textsuperscript{150}

Conflict-archaeological research in the United States is usually focused on the 19th century. Main issues are the classification of sites, artefact typologies and fine-tuning chronologies.\textsuperscript{151} Europe, on the other hand, focuses much more of its attention on conflicts of the 17th and the 18th century. Twentieth-

\textsuperscript{149} Wilbers-Rost 2007, 127-128.
\textsuperscript{151} Haecker and Mauck 1997, 6.
century conflicts are mainly characterised along ethnic or national lines, implying that warfare has come to have an ever-greater effect on civilians and their direct surroundings. Modern conflict archaeology is a relatively new specialism and its techniques are still under development. However, many advances have been made in terms of available techniques over the past three decades, and it is not necessary to develop a whole new theoretical framework. In general, the goal of archaeological research is to provide insight into past military practice.

Another approach used mainly in the United States and in the United Kingdom is KOCOA, a concept developed by military planners. It is an acronym for Key terrain, Obstacles, Cover and concealment, Observation and fields of fire, Avenues of approach. This approach is still used by the present-day U.S. Army to optimise its use of a landscape in a conflict situation. KOCOA is used to identify key terrain aspects of a conflict site. It can be applied in a variety of ways through space and time in order to interpret conflict deposits in tactical terms. Together with the principles of war, KOCOA forms a framework that makes it, according to American anthropologist Clarence Geier: “a key for understanding behavior during battle and provide researchers with a better junction of military practice with the historical and archaeological record”.

KOCOA can be applied best via GIS, especially when contemporary maps are used in the analysis. This framework can help us to understand the meaning of a landscape for specific individuals at a specific time, as well as for the events that took place across that landscape. Of course, this framework is not perfect and has its limitations, but when compared with accounts of participants and historical sources, it does allow archaeologists to draw some rough conclusions.

Is it possible to find a battlefield with predictive modelling? Much time can be spent on locating sites of battles known from historical sources from the 17th century onwards, but written records rarely let us pinpoint the precise location of battles fought in earlier eras. Medieval and earlier sites are much more problematic to locate than sites of more recent conflict, because very few artefacts can be attributed with certainty to a battle, for instance. To illustrate, arrowheads were recovered during the excavations at Towton, but many appear to have fallen from bodies or to have been collected from the site for re-use. With the introduction of muskets (which were common in the mid-16th century) this situation changed. Due to their small size, musket balls were not collected and the material survives relatively well in most soil conditions, unlike iron.

In Scotland, finding the exact site of a battle is a key concern, as locating battlefields on modern maps is a key requirement for inclusion in the Scottish Inventory of Battlefields, and thus for planning consideration. The American archaeologist Ryan McNutt developed an applied theoretical framework, aiding an agency of choice in the selection of terrain by means of a mental ‘grammar’ of conflict and tactical knowledge. His model can be utilised for battlefields with unknown or uncertain locations, as modelling prioritises high-probability areas within potential conflict sites, which can be targeted with archaeological fieldwork. Both macro-scale approaches (for instance the degree of devastation of settlement patterns) as well as micro-scale approaches (individual sites) can be used. By ‘rescuing’ these microhistories, archaeology reveals the very nature of war. For most archaeological investigations into (modern) conflict, historical documents, oral history and the archaeological record can be consulted. The strands of history are always multiple and intertwined, which is often demonstrated by archaeological investigations. Grand historical narratives will not be changed quickly, but archaeology does allow us to see and understand them differently.

---

152 Carman 2013, 55 and 80.
153 Scott and McFeaters 2011, 103 and 115; Sagona and Birkett-Rees 2016, 83.
154 Carman 2013, 46 and 58.
156 Bleed and Scott 2011, 48; Scott and McFeaters 2011, 115.
159 Carman 2013, 48.
160 Pollard and Banks 2010, 437.
161 McNutt 2014, 2 and 38.
162 González-Ruibal 2012, 472.
The large quantities of live ammunition on the former battlefields of WWI and WWII remain dangerous.\textsuperscript{163} In France alone, bomb disposal squads recover 500 tonnes of live ammunition each year. Archaeologists of the \textit{Institut National de Recherches Archeologiques Prévrentives} (INRAP) are now taking courses to help them recognise different types of ammunition and, more importantly, to be able to judge whether it is responsible or too dangerous to carry on with the excavation. Each year, the human remains of approximately ten soldiers are recovered in France, mostly on former WWI battlefields. In France and Flanders, it is common practice to investigate these deaths archaeologically.\textsuperscript{164}

Aerial reconnaissance plays an important role in the preliminary investigation of a conflict site. Aerial photography was developed during WWI and was applied on a large scale by all participants after 1915. These photographs do not only have historical value, but also form the cradle of present-day archaeological aerial reconnaissance. In the search for and research on WWI features and findings, these pictures are of great informational value. Furthermore, this is a perfect technique for non-invasive archaeological research. The aerial pictures of WWI are the first, truly reliable source of information that let us form an accurate image of the landscape at the beginning of the 20th century. After all, there are frequent errors on most early maps of Flanders, which were often copied on newer maps, but this kind of inaccuracy

\begin{figure}
\centering
\includegraphics[width=\textwidth]{image212.png}
\caption{Modern aerial photograph georeferenced with historic WWI aerial reconnaissance imagery through a process known as image warping, demonstrating the complexity of dealing with 20th-century remains of conflict. The sector near the lake at Bellewaerde near Ypres, Flanders is depicted. (After Scott and McFeaters 2011, 110).}
\end{figure}

is not possible on aerial photographs. It is also possible to locate the sites seen on the photographs with great accuracy, and aerial photographs enable researchers to identify trenches and related features on a wider landscape scale.\textsuperscript{165}

To use these pictures correctly, vertical records are needed, which must then be geo-referred with Geographical Information Systems (GIS). This involves distorting old pictures and projecting them on recent maps and new aerial photographs. This technique is called ‘image warping’ and is used to relocate old structures in the present-day landscape.\textsuperscript{166} Image warping is primarily practiced in Flanders on the former battlefields of WWI (Fig. 2.12). These images have the potential to provide three sorts of crucial information: (1) natural and topographical phenomena, (2) structures and relics from WWI, and (3) ‘traditional’ archaeological sites and (pre)historic features in the landscape.\textsuperscript{167}

In total, 1,128 aerial photographs taken during WWI were put into a database, after 1,039 exact locations were identified. Such a database was necessary to be able to make a proper selection of images that could be of archaeological, historical and geographical importance. Obviously, the quality of the old photographs varied, but it was still possible to identify a total of 2,130 structures on the basis of these images. This mainly concerned trenches, but also included a total of 373 previously unknown dugouts.\textsuperscript{168} These pictures can be used before, during or after an archaeological excavation. In addition to aiding the identification of archaeologically important WWI structures, the photographs also shed light on early medieval castle hills, late medieval canals and 17th-century fortresses and castles. These aerial pictures can also be used for purposes other than archaeology, such as for mapping the decline of forest resources or registering flood areas.\textsuperscript{169}

In the Netherlands, it should be possible to conduct this type of research in much a similar way. WWII aerial photographs of the Ginkelse Heide, for instance, show a series of remarkable crossing lines, and in some locations, these features are also detected on the ground. The features in question are shallow ditches, probably furrows, and a diary entry was used to confirm that these features are, indeed, furrows, made by the German Army as early as 1940 and 1941 as a protective measure against Allied airborne troops. These obstacles were probably built in order to protect the nearby airfield of Deelen, north of Arnhem,\textsuperscript{170} and the so-called Diogenes bunker. This bunker was the command post of the 3rd Fighter Division\textsuperscript{171} of the Luftwaffe and formed the nerve centre of the aerial defense of the Netherlands, northern Belgium and the Ruhr-area. The bunker had a direct connection with the Luftwaffe Headquarters in Berlin.

When researching any given era, one should be critical with every source of information. For a long time, however, this approach was not common in the Netherlands when examining sites of modern conflict – at least not on an academic level. There are enormous quantities of photographs, films, memories and official documents of WWII in the Netherlands, but these sources should not be regarded as a complete and watertight overview of (recent) conflict. Each participant in a war literally reports events in a one-sided manner. The most famous and well-known pictures of WWII are usually staged, and incorrect information was often deliberately included on regimental maps. After all, if the enemy were to seize maps with confidential information about troop positions, this could have disastrous effects. With this in mind, several maps of a particular area circulated to mislead the enemy.\textsuperscript{172}

However, not all information on the various versions of regimental maps was incorrect on purpose. For instance, on a British map used during the Battle of Arnhem (17–25 September 1944) a house was marked as *Graftombe*,\textsuperscript{173} but *Graftombe* is an area, rather than a house. Even memories cannot be regarded as being fully accurate. During combat, it is impossible to register the whole area in detail. Furthermore,
memories will be tinted. Finally, even though trenches and foxholes are detected, this does not mean that any fighting actually took place in the area. Archaeological research can give a definitive answer, but it is important to compare all available sources.\footnote{Knoop 2006, 27; Kok 2009, 14; Kok and Wijnen 2011, 62-63; Wiest 2015, 9.}

Conflict archaeology requires a multi-disciplinary arsenal of techniques and a more encompassing, multi-dimensional approach to investigate the remains of a conflict site properly.\footnote{Haecker and Mauck 1997, 6; Sagona and Birkett-Rees 2016, 83.} As discussed, each conflict site, and each era demands its own specific set of methods and techniques. The available evidence always depends on the age under investigation, the weapons used, the type of action and post-deposition factors. A medieval battlefield is less easy to locate on sight than a WWI battlefield with its countless craters and trenches. Trenches from WWI had a different purpose than foxholes during WWII.\footnote{Sutherland and Holst 2005, 20-21; Carman 2013, 42-43.} For archaeologists, this new kind of warfare requires a different approach to studying military action. The traditional methodology of battlefield archaeology (e.g. identifying a battle’s location, unearthing weapons and defensive structures, and evaluating historical and literary texts) will not do when it comes to understanding the geographic reach and social impact of WWII.\footnote{Anonymous 2011.}

Even among professional archaeologists, the most common instrument used in conflict research is without a doubt the metal detector. Because metal detectors are also popular among looters, they were shunned by archaeologists for a long time. However, they are very useful tools in the quest to (re)locate conflict sites. With this device, it is possible to trace metal artefacts of the size of a coin (and larger) at depths of up to 30 centimetres, depending on the soil conditions. A metal detector survey can be used to locate a conflict site accurately and identify smaller actions within the main battle, for instance. Dense clusters of metal objects are often a reliable indication for locations that saw the heaviest fighting during a battle. Furthermore, the distribution of bullets across a conflict site can reveal a ‘static’ or a ‘dynamic’ pattern, as demonstrated primarily at Little Bighorn.\footnote{Scott et al. 1989; Pollard 2011; Pollard and Banks 2010, 437; Van der Schriek and Van der Schriek 2014, 233.} In chapter 5, this will be outlined in more detail.

More recently, two Roman battlefields, both in Germany, have been precisely located, namely Kalkriese and a previously unknown battle from the 3rd century AD at Harzhorn. In both cases, careful analysis of the distribution pattern of the artefacts located by metal detectors allowed researchers to reconstruct the battle by. At the battlefield of Kalkriese, the archaeological investigation revealed an ambush context.\footnote{Rost 2007; Wilbers-Rost 2007; Scott and McFeaters 2011, 110; Carman 2013, 46 and 49.} The battlefield of Harzhorn was only discovered in 2008. Not a single historical source can be linked with certainty to this battle. Based on the discovered archaeological archive, it is most likely that it was a ‘hit and run’ attack around AD 235, perhaps as a reaction to a Roman revenge campaign into Germania Magna. The main artefacts found included weapons in situ, specific concentrations of artefacts and human remains. This is quite comparable with a modern conflict site. Different methods and techniques were used at Harzhorn, including metal detecting surveys, surface analysis (airborne laser scan) and small-scale excavations.\footnote{Rost 2007; Callies 2011; Berger et al. 2013.} A field survey is also often used to obtain vital information on an area without destroying the remaining features.\footnote{Cf. Sutherland and Holst 2005, 21 and 23.}

Conflict archaeology is without doubt a legitimate field of study and has an independent dataset that can be compared with historical sources, oral history, contemporary and present maps, participant accounts and other sources.\footnote{Scott and McFeaters 2011, 116.} Conflict archaeology has the potential to become and remain a distinctive branch within the wider archaeological discipline – not just abroad, but in the Netherlands as well. Conflict archaeologists should find out, record and care for all the available evidence of (mass) violence...
from all eras. By doing so, archaeologists can cultivate a public perception of warlike behaviour over the course of human history.\textsuperscript{183}

Nowadays, many European countries do pay attention to the fragile heritage of both WWI and WWII, but this attention is usually focused on architectural remains such as bunkers, rather than the archaeological record beneath the surface. Yet, features above and below the surface are inextricably connected. When performed properly and interpreted carefully, archaeology can play an important role in the modern experience of a former conflict site, where the events and individual experiences of people involved or caught up in war can be demonstrated on a detailed, recognisable and, most significantly, on a human scale.\textsuperscript{184} We tend to feel a sense of connection to the lives of combatants, who, in some instances, may also be relatives, but who can always be empathised with as fellow human beings and as predecessors, in some sense. Landscapes of commemoration allow for the reaffirmation of personal ties and are a way of remembering and of exploring individual and collective identities.\textsuperscript{185}

\textsuperscript{183} Carman 2013, 94.

\textsuperscript{184} Myers 2008, 243; Van der Schriek and Van der Schriek 2014, 229; Sagona and Birkett-Rees 2016, 83.

\textsuperscript{185} Veterans Affairs Canada 2000.
Chapter 3 – Landscape biographies of commemoration

3.1 Landscape Biography

All social structures, ranging from world-wide cultural communities to local networks of individuals, develop more or less specific memory cultures to connect places, buildings and land to memories and notions of ancestry and origin. One can focus on several histories in the landscape or emphasise one single moment in time. This chapter will discuss two examples of landscapes of commemoration using a landscape-biographical approach. This approach is used to demonstrate a multi-vocal past with its complex overlapping layers of social, economic and political history. Wars are etched into the memories of nations, communities and individuals. What people remember, and how, changes with time, especially now that historic events related to WWII are disappearing from living memory, since all personal connections to the events in question will soon be lost. This chapter analyses how nations, local communities and individuals shaped and reshaped their violent pasts through time.

The landscape-biographical approach was developed by Dutch archaeologists in the 1990s as an alternative to the traditional methods for valuation and selection in cultural history. It uses a historicizing, longue durée (long-term) perspective and focuses on the study of the interrelationships between spatial transformations, social and economic changes and the construction of identities (both national and individual) in a region. The American geographer Marwyn Samuels (*1942), a pupil of Donald Meinig (*1924), was the first who proposed using the term ‘biography’ in an almost literal sense. In his work, Samuels (1979) connected the histories of landscapes, life histories and the social environment of individuals that have shaped landscapes over time. The history of a landscape is, above all, the result of human actions in the past. The landscape-biographical approach was derived from the field of landscape archaeology. At present, this approach is regularly used by policy makers and heritage management as a selection tool which makes it therefore explicitly relevant to archaeologists.

Landscapes are not passive by-products of anonymous economic and social developments. The history of a landscape can only be fully understood through the lens of the history of its inhabitants: landscapes are authored. These authors can be companies, such as Philips in Eindhoven, but they can also be anonymous, the nobody in particular. Landscapes are never simply passive expressions of anonymous processes, and it is essential to understand the meaning of landscape history. In deciding how to represent a particular landscape, for instance by means of monuments, the author conveys a powerful message. Of course, other groups (ethnic groups, individuals, nations) can have different views on the same landscape. A biographical approach to the study of conflict landscapes is crucial for a full understanding of their changing meanings. Memories of past events are never fixed but change continuously, influenced by individuals, groups, or nations. More than ‘classical’ archaeologists, conflict archaeologist work with memories, and,

---

1 This chapter is based on my article (2019), which was published in the peer-reviewed journal Landscape Research.

2 Misztal 2003, 135.

3 Van der Schriek 2019.


as discussed in the previous chapter, archaeology can also play a role in creating new ‘memories.’ The landscape-biographical approach can provide innovative new means of dealing with the materiality of conflict, heritage management and commemoration. The concept of a biography of a landscape can be used as a tool to work on multi-disciplinary topics. An important aspect of a landscape–biographical approach is authorship, which will be demonstrated in the case studies of Ypres and the Potsdamer Platz, Berlin. Obviously, landscapes are an essential part of the world that people live in and perceive. The history of a landscape is, above all, the result of human actions in the past. Landscapes are connected to people at an individual level, with their personal histories, but they are also part of a wider, collective world history. Landscape can be regarded as a social (cultural) construct, made and remade by different authors.

The landscape-biographical approach is used to study the historical layeredness of a landscape in the past and in the present. This stratification can be of importance for the ‘functional’ history of an area. First, spatial ordering can be seen and the palimpsest of the resulting spatial structure at a particular moment in time. These can be both tangible as well as intangible, such as transmitted traditions. Secondly, as the perspectives of individuals and groups in a multi-vocal landscape change constantly, the way in which the past is experienced shifts as well, and heritage adapts itself to the new era. Thus, the concept of the biography of a landscape can be used to make explicit how the construction of heritage is embedded historically in landscape developments, serving as a valuation method to indicate important and unimportant landscapes, and as a tool to research (local) identities. Of course, using this concept as a narrative can be substantially subjective.

A historical analysis focuses on cause and effect in search of the ‘truest’ version of past events. However, in order to study the historical layeredness of a landscape in both past and present, another approach is needed. Memory is a mix of history, testimony and imagination. Heritage, memory and history are indissolubly connected. How are they related and what is or was their specific role in the creation of a landscape of commemoration? As discussed in chapter 1, the interest in the heritage and remembrance of WWII has increased in the Netherlands in recent years. The Heritage of War programme stimulated both the digitisation of the existing collections and the development of policies with regard to the tangible heritage of WWII. Much has been published about the rituals of memory, but far less about the transformation and (re)development of commemorative landscapes. In this chapter, a landscape-biographical approach will be used to analyse two war-torn commemorative landscapes. Landscapes of commemoration are subject to constant changing and are often contested or even contradictory. This theoretical framework enables us to research the practices of remembrance and its tensions, and social change at the same time.

Again, using this approach as a narrative is hugely subjective, since memories are always coloured and influenced. Memories can be contested and processes of remembering and forgetting are formative for a landscape of commemoration. What is important enough to preserve for future generations and what can be excluded? Commemorative landscapes are places where successive generations cultivate, adapt and expand their cultural memory. Over the years, newer generations gain a degree of inner distance from the events. The purpose of the landscape-biographical approach is to visualize both these physical and symbolic changes. Within the field of modern conflict archaeology, the value of memory cannot be denied.
logical research on sites of modern conflict has a commemorative function in itself and will have an effect on memory narratives. In order to properly understand the (often contested) meanings of landscapes of commemoration, both the symbolic meanings, as well as the historic context need to be taken into account. Such landscapes cannot simply be examined only by means of an archaeological layering of time.

Conflict sites nestle themselves into the landscape and change both the physical landscape and how they are perceived and remembered. First of all, landscapes are transformed by nature and humans. Later, memories will change when narratives are altered. Over time, events are reduced to an indirect, abstract and often idealised image of the past, even though both World Wars are fairly recent and well documented. Collective memory is used in the transformation of heritage, and heritage is used to construct and reconstruct social values, cultural values, and meanings of the past for the present. Although memory and identity are often linked and crucial in giving meaning to our world, they have not often been subjected to critical research.

When the more recent past is researched archaeologically, commemorative practices grow in importance. Roman artefacts will never be labeled as being part of an occupying nation. With regard to the remains of WWII, there is a strong emphasis on Allied artefacts, whereas the Germans left the most archaeological remains. Decisions on preservation and destruction need to be carefully legitimised. In contrast with older eras, one has to deal with strong commemorative values, which is why it is important to include landscapes of commemoration into a WWII-based archaeological study. In this case, landscapes of commemoration are focused on the nationalisation of the past by means of mourning and the creation of monuments, not as landscapes of commemoration with a wider symbolic connotation, like the river Rhine. The landscape-biographical approach gives the cultural heritage management sector a tool to suggest new narratives and to document the inherent heritage of war.

3.2 Scope and definition of heritage

Nations frequently rely on the past to create their present by offering a sense of historical validation for the constructed national identity. The heritage of a nation state is usually politically coloured. Individual experience may be less politically determined and can be very different from a nation’s ‘official’ heritage policy. Heritage can be used both to determine the tangible past and to express the ideas and values of contemporary society. Dealing with the past within the landscape is an integral part of the spatial condition of societies. Heritage is often contested and consists both of material and immaterial culture, which is cultivated by different individuals and social groups. Nations demarcate their territory with it, individuals derive their identity from it, and heritage can even be ‘stolen.’ Individuals, (social) groups and even nations can violently claim or destroy the opponent’s cultural identity expressed in the landscape. Groups and individuals can be subdivided on the bases of religion, ethnicity, nationality and political orientation. Even amongst these groups, there is no true ‘collective’ memory. Collective memory refers to both a shared past as well as a collectively remembered past and changes over time.
From a landscape-biographical view, heritage is closely tied up with the values and identities in contemporary society and local communities. Heritage is never an objective historical given, as both memories and constructed histories must be understood within the context of the present. Places in the landscape (for example, a tree, a house, a monument), which anchor people to their living environment, were and are of key importance for the identity of a local community.\textsuperscript{27} A reciprocal and historically grounded relationship exists between a community and landscape. The landscape generates both the symbols and the means through which communities define themselves and represents a sense of identity and belonging. Of course, some diasporic communities nowadays only carry a mental landscape in their mind. Landscapes can be purged of their former communities, with well-known examples including the ethnic reorganisation of the newly incorporated territories in the East by Germany after the invasion of Poland and the Soviet-Union and, after the end of WWII, the thorough Polonisation of former German territories like Prussia and Pomerania. Societies change over time and so does the attitude towards their heritage. Landscapes can be cleansed of the past, of ‘unwanted’ heritage. Heritage sites can be researched by means of a landscape-biographical approach, visualising physical and symbolic changes.\textsuperscript{28}

Heritage is valued and cultivated on different levels. What is considered heritage at a given moment can lose its importance or, on the contrary, strengthen in significance. Heritage has also become more and more part of the entertainment industry and is used for commercial reasons in many regions and places. The past is actively used for purposes in the present, which is why heritage is often more meaningful for the present than for the past. Heritage is an active process, in which meaning is created through remembering.\textsuperscript{29} However, the whole history is seldom displayed. Histories of flourishing times are more often presented than histories of deterioration. This often results in an idealised past, the way people would like to see the past, not how it really was.\textsuperscript{30} Past and present are indissolubly connected, known as \textit{présentisme}.\textsuperscript{31}

A ‘tradition’ in Western history or heritage culture is the idea of a \textit{national} heritage. The term national heritage suggests that something is old, but it can, in fact, be quite new. More important is the \textit{suggestion} of authenticity. Heritage is not only created by collecting, preserving and conserving, but includes the active giving of new meanings. The transformation of history into memory and the need for a spatial experience of the past was already noted by the French historian Pierre Nora (*1931). In today’s heritage debate, the falsification or rewriting of history takes a central place. For the American historian and geographer David Lowenthal (*1923–†2018), heritage is not a \textit{wrong} but a \textit{different} way of dealing with the past: this selective nostalgia, a sentimental longing for a specific era, tells it like it was not. Nostalgia presupposes a self-conscious relationship with history.\textsuperscript{32}

But what exactly is heritage? The United Nations Educational, Scientific and Cultural Organisation (UNESCO) outlines heritage as: “Our legacy from the past, what we live with today, and what we pass on to future generations. Our cultural and natural heritages are both irreplaceable sources of life and inspiration.”\textsuperscript{33} Heritage includes all features, traditions and objects from the past that a society or a social group has decided to preserve for future generations. ‘Our’, as used in the UNESCO definition, should be interpreted as a western view on heritage, for heritage can be experienced rather differently in various countries across the globe. It should be borne in mind that such definitions are the outcome of political debates and negotiations and are not the result of in-depth, universal research. A more refined terminology of heritage does not exist, since there is no uniformity between countries, and consensus on a mutual cultural herit-
age and common values does not really exist. However, heritage is an ideal way of creating and cultivating a ‘collective’ memory, and it has been used and abused widely in this way, dominated by ideological values. It can be used to construct a sense of identity for a vivid claim to power, land and legitimacy, for instance. According to heritage specialist Laurajane Smith, heritage: ‘is a cultural process that engages with acts of remembering that work to create ways to understand and engage with the present.’

Many countries began to manage and conserve ‘their’ cultural heritage at an early stage. As early as 1270, it was forbidden to demolish any monumental building without approval in Tuscany, Italy. In the 17th century, Sweden was one of the earliest countries to introduce explicit, compulsory cultural heritage legislation. In Denmark, the first cultural heritage law (1861) was designed to preserve older buildings in their original condition. The development of conservation principles has been the most significant achievement of conservation activities. From the start, heritage has been considered as an inalienable element of a nation, which led to an attitude which emphasised a need for the preservation of heritage sites.

Stricto sensu, the use of a landscape biographical approach is already an example of present-day heritage practice, as it is an explicit act of remembrance. Locality, memory and community are embedded notions; they stand in a reciprocal relationship to each other, and are thus produced through each other. A sense of community is about collective and shared identity and can consist of the feeling of belonging to a locality. Every landscape is organised by its inhabitants, both physically and mentally, and people derive identity from how they organise the landscape. All landscapes contain a mixture of new and old elements, which form part of the collective memory of a local community. Identity is a construct bound to time, space and context.

An example of stolen and reinterpreted heritage can be found at the present-day border of Denmark and Germany. After the Second Schleswig War (1864), Denmark was forced to hand over the duchies of Lauenburg, Schleswig and Holstein to Prussia. On 18 April, the decisive battle took place at the village of Dybbøl, now renamed Düppel under German authority. Quickly after the battle, a landscape of commemoration was formed. In 1885 a new hotel opened its doors, which could accommodate up to 1,000 guests: the road from nationalism to tourism is often not that long. For Germany, ‘Düppel’ was a symbol of courage and self-sacrifice. For the Danes, ‘Dybbøl’ symbolised the Danish identity of the region and embodied the hope for reunion with Denmark. In 1920, Dybbøl became part of Denmark again and the community of Sønderborg immediately bought the old battlefield and assigned the whole area to the Danish state. The landscape was restored to its original condition and any further development on the battlefield has since been banned. Today, this landscape of commemoration may appear very Danish, but, in fact, it was mainly arranged by Germany. However, Germany used many Danish symbols and also honoured its former opponents, making it easier for Denmark to take over this heritage. The organisation of the landscape hardly changed, only the meanings of the monuments altered.

On 11 November 1998, the Island of Ireland Peace Park at Messines (Mesen) near Ypres, Flanders, was unveiled by former Irish president McAleese, Queen Elizabeth II, King Albert II and some of the last remaining veterans of WWI. The Battle of Messines Ridge (7-14 June 1917) was one of the few WWI battles in which Irishmen, regardless of religion, fought side by side. The site is dedicated to all Irishmen killed during the war. In the centre, a round tower has been erected as a symbol for the national identity of Ireland. Irish round towers were built around the 10th century AD as bell towers and places of refuge for the invading Vikings. Thus, a material symbol of Ireland was ‘exported’ to Flanders (Fig. 3.1).

In modern warfare, there can also be a policy of deliberate destruction of the heritage of the enemy in order to erase its identity. When this occurs in an urban context, it is labelled urbicide.
was used during WWII, for instance, when Hitler ordered the bombing of churches and cathedrals in England. A more recent example is the Bosnian War (1992–1995). In 1993, the medieval bridge Stari Most (‘Old Bridge’) in Mostar, Hercegovina, was deliberately destroyed by Croat Catholic nationalists. The Stari Most was reconstructed in 2004 and was added to the UNESCO World Heritage List a year later. Other recent cases of urbicide can be found in the Iraq War (2003–2011), where mosques were bombed on purpose, or the conflict between Israelis and Palestinians in the Gaza Strip. The intentional demolition of mosques and churches and the looting of archaeological sites and museums in Iraq, Syria and Afghanistan represent the serious threats facing cultural property. However, that is a different topic which goes beyond the scope of this chapter.

3.3 Landscapes of commemoration

Landscapes of commemoration are of great significance to our present-day world. During the 20th century, Europe’s landscapes of commemoration have significantly increased in number, spatial and social

---

43 Riedlmayer quoted in Shatzmiller 2002, 104; Coward 2008, 35.
44 The Italian researcher Francesco Mazzucchelli argues for widening the term of urbicide to include both the destruction and reconstruction of cities. According to Mazzucchelli, Mostar is in a phase of post-urbicide. The urban topography of the reconstructed city of Mostar reproduces the topography and topology of the Bosnian War. The selective reconstruction has left a competitive architectural marking which still blocks communication across ethno-religious boundaries, just as it did in the war. After: Mazzucchelli 2016.
45 Bevan 2006; Van der Auwera 2012, 49 and 57; cf. Van der Laarse 2010, 325.
scale and cultural importance. According to various scholars, this process started after the WWI, when European societies felt a strong need to express their mourning for the millions of dead. However, the practice of listing individual names on local monuments started in Prussia and France as early as the 1790s. Individual burial of soldiers was already practiced during the American Civil War (1861–1865) and the Franco-Prussian War (1870–1871). Nevertheless, memorialisation of war did not emerge as a primary phenomenon in Europe until the late 20th century.

The need for memorial landscapes was revitalised after WWII, when the emphasis gradually shifted from the national and heroic to a global commemoration of (Jewish) victims, making the ‘holocaust experience’ a dominant factor in international commemorative practices. These practices were also becoming more democratic and local and the influence of nationalism waned. Various (international) anniversaries, such as the 50th anniversary of the end of WWII (1995) or, more recently, the centenary of WWI (2014–2018), significantly increased commemorative practices.

The fast-growing popularity of landscapes of commemoration not only encourages new developments, but also raises new questions and problems. Most of these are centred on issues of authenticity, uniqueness and identity, matters of ownership and accessibility (who owns the past?), historical interpretation and integrity (which story to tell?), and tensions between global tendencies and local practices and traditions. Furthermore, touristic value can differ from academic value. Although museums organise

---

47 Savage 2009, 239; Login 2015, 31 and 33–34.
48 Mosse 1990; Young 1993; Planzbaum 1999; Misztal 2003, 2, 127 and 130; Smith 2006, 57.
collective memory (and can, for instance, emphasise nationalism), tourists do not simply ‘consume’ heritage sites, but can also influence museum developments and conservation movements.50

Important questions to ask are how and why both individuals and groups who share the same landscape have different and often opposed ways of understanding its significance. Memory and emotions are often interconnected.51 Memory can be expressed in many ways, such as monuments, museums, formalised rituals of commemoration (Fig. 3.2), archives and centres of education, which symbolically unfold the history of a nation or that of particular regions and communities.52 Individuals and social groups will make different choices with regard to remembering and forgetting, two very important formative principles for a landscape.53 Cultural amnesia is equally important as a memorial practice. Memory can be characterised by its fluidity and variability, and the meaning of the past is continuously rewritten and reinterpreted by the present.54

The official memory of WWII, for instance, was very different in East Germany (1949–1991) than in West Germany. Between 1945 and 1965, both states used the past to justify their own political order. Not surprisingly, East Germany glorified the contribution of anti-fascist and communist resistance and marginalised the Jewish suffering. In West Germany, on the other hand, various groups were included, even the military, and the Jewish suffering was recognised. Coming to terms with the past became a key focal point. In East Germany, no alternative versions of the past were tolerated and the official memory remained stable.55

50 Misztal 2003, 21; Smith 2006, 30 and 197; Savage 2009, 176–177.
51 Misztal 2003, 1 and 5.
The way the past is experienced has also changed through the centuries. With the invention of photography, the past became much closer, both in experience and in imagination. The oil painting ‘Dans les tranchées’ (1874) by Alphonse de Neuville (*1835–†1885), for instance, depicts members of the French army in a shallow trench during the Franco-Prussian War of 1870-1871 (Fig. 3.3). The black-and-white photograph, on the other hand, depicts one of the six fortresses of Sevastopol after being taken by the Allied armies in September 1855 (Fig. 3.4). The Siege of Sevastopol was one of the most important battles of the Crimean War (1853–1856). The Franco-Prussian War occurred 14 years later, but the photograph conjures up the past more vividly than the painting. When colour photographs appeared, history came yet another step closer in the experience of time.

Similarly, archaeology can present a much more vivid experience of the past to the general public — as outlined in the previous chapter. Of course, the determining factor of ‘time’ cannot be approached in an uncomplicated manner. Not a single landscape is a tabula rasa. After all, the spatial development of a landscape takes place amidst the remnants of an older landscape, its historical stratification. Another important concept in the study of modern conflict are so-called microhistories, as introduced by Carlo Ginzburg (*1939). A microhistory is an intensive study of a well-defined smaller unit of an era, for instance a single event, an area, a community or even a person. Any individual can be used as the exit point to illustrate a larger, complex event, like the inquisition.

56 Pollard and Banks 2007, iv; Myers 2008, 243; Sagona and Birkett-Rees 2016, 83; Stichelbaut et al. 2017, 235. 57 Meinig 1979, 44.
How should one deal with the material traces of war and conflict in the landscape? Personal connections with the memories presented weaken as time passes by. As a consequence, identities are no longer based on a shared experience of the past, but are derived from a common heritage rooted in the past. Memories are both continued and transformed by successive generations, adapting and expanding their cultural memory and choosing a suitable past for the present. The history of commemoration is characterised by change and transformation. Commemoration of conflicts varies strongly from one era to another, as well as between regions. Erecting monuments, public exposure of battle remains, creating songs or myths are just a few examples. The western perspective on heritage also substantially emphasises materiality and authenticity. As a discipline, archaeology plays an important role in authenticity claims. The heritage of conflict sites is always political, dynamic and contested – as illustrated in the following case-studies. For this chapter, I selected two internationally well-known war-torn landscapes which have been extensively researched. Furthermore, these landscapes are contrasting on many levels: a rural landscape is compared with an urban landscape, in the first case-study only one era is vividly remembered, while the other case-study deals with a more multi-vocal landscape. The important similarities are that both landscapes were heavily affected by modern warfare as well as the changing meanings through the years.

3.4 Ypres and the commemoration of WWI

As outlined above, monuments are a powerful expression of how people experience the past. Landscapes of commemoration are never static. Everyone who visits the former battlefields of Ypres might presume that only WWI shaped this landscape of commemoration. Although it is true that there is a strong emphasis on 1914-1918, there are more legacies in the landscape. This part of Flanders was already inhabited a long time ago, with several settlements in the region dating back to the Iron Age, such as the 5th-century BC hillfort on Kemmel Hill. According to the excavated findings, this settlement was part of an international elite culture in which drinking, weapons and horses played an important role. Erosion and WWI, however, obstructed further research into this era.

In Roman times, the region belonged to the civitas Menapiorum, which had Cassel as its capital. Caesar needed over a year to gain control over the local inhabitants. However, the region was never Romanised to a significant extent. Most settlements were inhabited by locals who were hardly touched by Roman culture. The inhabitants mainly practiced agriculture and cattle-breeding, and there were several potteries and metal workers in the area. Salt-making was another important source of income.

The town of Ypres was first mentioned in written sources in 1066. The trade in cloth brought much wealth to the region in medieval times, which was expressed in the landscape by means of imposing public buildings. The construction of the famous Cloth Hall (Fig. 3.5), the city’s main eye-catcher, started in the 12th century AD. It took over a hundred years before the building was completed. In this part of Flanders, even the smallest villages could afford their own church. The area was densely populated but had an open character.

Flanders had been the stage of wars before, for instance the religious wars of the 16th century. The iconoclasm reached Ypres on 16 August 1566, before going up north to Antwerp (20 August), ’s Hertogenbosch (22 August), Amsterdam (23 August) and eventually Leeuwarden (6 September). For a long time, ‘The Death of Ypres’ referred to the plague that swept through the city in 1349. However, the meaning altered
conspicuously after the outbreak of WWI and the complete destruction of the region that ensued.\textsuperscript{65} German troops occupied the area in October 1914. Exactly four years later, in October 1918, the last German troops retreated from the frontline at Ypres.\textsuperscript{66} The first Battle of Ypres took place in November 1914. Only a few months later, in April 1915, the Germans started a second offensive and introduced a new weapon on the battlefield: chlorine gas. The Allied lines did break but the German Army reacted insufficiently, and the war did not end for another three and a half years. In 1917, British command launched a large offensive, which, ever since, has been imprinted in the collective memory as the Battle of Passchendaele, fought in a desolate pool of mud that stretched as far as the eye could see. It took six men twelve hours to bring a wounded person back from the frontline, crossing a distance of just 1.5 kilometres. After five months, the Allies had gained just eight kilometers. Approximately 300,000 soldiers from the Commonwealth and 260,000 German soldiers died during these months. In March 1918 a fourth offensive was launched in the area as part of the German Spring Offensive. The war of the trenches was over, but the German Army lacked sufficient equipment after four years of fighting and morale suffered greatly. On 28 September 1918 the German Army retreated from all fronts.\textsuperscript{67}

During the war, the area around Ypres transformed into a battlefield, a completely desolate landscape, destroyed by artillery, with soldiers sleeping, fighting, living and dying in the mud. In 1919, a man on horseback could oversee the whole city. Present-day Ypres is a ‘new’ medieval town, a reconstruction of

\textsuperscript{65} Vandewoude 1943, 52 and 78; Van Houtte 1974, xiv; El Kenz 1993, 90.

\textsuperscript{66} Margriet-Marie 2002, 47; Verbeke 2006, 63.

\textsuperscript{67} Simkins 1992, 163; Brants and Brants 2001, 91; De Vos 2000, 83; Verbeke 2006, 63.
its past. The dates on the façades of the houses, however, show that the city is less than a century old.68 As discussed, the end of WWI was followed by a new form of memorialisation on an unprecedented scale. The world had never seen warfare and destruction on such a large scale before and it demanded remembrance.69 After the armistice on 11 November 1918, the following problems announced themselves: which memories of which era should be contained and preserved in the landscape? One of the suggestions was to preserve the entire former western front as a monument, about 500 kilometres long and 25 kilometres wide. The frontline was to become one large Voie Sacrée, connecting all military cemeteries and battlefields.70 However, directly after WWI, most local communities tried to ignore the war as much as possible. Cities and villages resurrected, people reclaimed their former land and established themselves more or less at the same places as before 1914. Even the parcels of land retained the same shape they had before the war. Trenches and shell holes were filled up and agricultural lands were rearranged. However, it was impossible to ignore the (unburied) dead and the massive amounts of live ammunition, which is found in large quantities up to this day (Fig. 3.6). In the most severely damaged areas, over 1,000 shells were dropped per square metre. Nowadays, 250,000 kilos of explosives are cleared in the former Ypres Salient each year. In 90 years’ time, between 12 November 1918 and 12 November 2008, a total of 358 deaths were recorded in the region as a result of the dangerous ammunition.71

Every single major conflict site nestles itself into the collective memory of the local inhabitants at the very least, in particular when the national identity is under attack and the aggressor is halted. What the Battle of Thermopylae (480 BC) means for the Greek, the Battle for Stalingrad (1942–1943) for the

---

68 Saunders 2001, 38; Meire 2003, 18 and 126.
70 Saunders 2001, 42; Brants and Brants 2004, 74.
71 Saunders 2001, 39 and 46–47; Dendooven 2006a, 105; Desreumaux 2011, 49.
Russians and the Battle of Verdun (1916) for the French, Ypres (1917) means for the British. As outlined above, the region of Ypres has a long and diverse history, but the former WWI battlefields can give the impression that this landscape of commemoration was shaped solely by this event. On the former British battlefields of WWI, of which Ypres is one of the most important, three main memories are cultivated. Firstly, the official, state-sanctioned patriotic memory, created by the British government. Secondly, a different and more nuanced memory was created by the veterans themselves. Finally, a ‘historic’ memory was created both by tourists who visited the battlefields and museums (like the In Flanders Fields Museum), which presents specific stories from the years after the war up to the present day.

For many, WWI was a decisive moment in a long-term trend, influencing the nature of commemoration practices, war memorials and even types of mourning. The national narratives, focused on heroic sacrifice, and personal commemoration, concentrated on private mourning, were very different. The farmers reclaimed their land, while the soldiers and civilians wanted a place to mourn. Locals voted for the reconstruction of their hometowns, whereas ‘foreigners’ wanted to preserve the ruins. To preserve ruins for future generations was not a completely new idea. In Lycurgus’s oration ‘Against Leocrates’, we find: “I will not rebuild a single one of the shrines which the barbarians have burnt and razed but will allow them to remain for future generations as a memorial of the barbarians’ impiety.”

---

72 For the Belgians, Ypres is an everlasting token of their gratitude towards the soldiers of the Commonwealth. The Third Battle of Ypres (1917) was the largest battle ever fought on Belgian soil. The Belgians have their own national WWI battlefield, namely the Trench of Death (‘Dodengang’) near Diksmuide.

74 Misztal 2003, 45; Rass and Lohmeier 2011, 196.
75 Misztal 2003, 121; Suleiman 2006, 43; Login 2015, 75.
76 Van Eeno 1999, 7; Meire, 2003, 132.
77 Lyc. 81.
Every community with a connection to a former conflict site deals with the past in its own way. However, four main possibilities can be distinguished. In the first place, we see attempts towards a reconstruction of the pre-war situation, as happened in Ypres. However, 'identical' should not be taken literally: some buildings were never reconstructed and others, most often churches, were rebuilt in a completely different style. The second option is an attempt to 'freeze' the past, to conserve the ruins of a town or village and consider it Holy Ground, turning it into a so-called 'village martyr.' In France, such villages still have a (symbolic) mayor. The most well-known village martyr is without a doubt Oradour-sur-Glane, 20 km south of Limoges (Fig. 3.7). Here, time stands still for eternity, halted on 10 June 1944 between 16:00 and 17:00, when members of the 2. SS-Panzer-Division ‘Das Reich’ surrounded the village and killed 642 inhabitants. A third option is not to conserve a whole town but just one specific ruin, a ‘zone de silence’ like the Atomic Bomb Dome in Hiroshima, Japan, or the Kaiser-Wilhelm-Gedächtniskirche in Berlin, Germany. The final option is to build an entirely new town on the foundations of the older city as happened in Rotterdam, the Netherlands. Obviously, many sub-forms are possible within these four main options.

Winston Churchill (*1874-†1965) was one of the supporters of preserving Ypres as a ruin. In 1916, he briefly commanded the 6th Battalion of the Royal Scots Fuseliers near Ploegsteert. The Belgian architect Eugène Dhuicque (*1877-†1955) shared this opinion, deeming that every era deserved its own place in history. Three main aspects were crucial in the discussions surrounding the reconstruction of Ypres. Firstly, the functional value of the city – after all, people lived in the houses. Secondly, the town did have a cultural historical value before the war, as expressed in the famous Cloth Hall. This cultural historical value was now lost for the largest part. Finally, Ypres had a symbolic value for the Commonwealth troops, serving as a symbol of persistence. As a ruin, the city would most likely have had a more powerful symbolic value, but the main reason for rebuilding Ypres was that the inhabitants could best identify themselves with the past in this way. The former buildings were what anchored them. Another argument for reconstruction was that the pre-war city already lived from tourism. Nonetheless, memory is more often an idealised reconstruction of past events, not a reproduction. For example, after the war, several demarcation stones were placed on the former western front to mark the furthest advance of the German Army with the inscription: HERE THE INVADER WAS BROUGHT TO A STANDSTILL. During WWII, the Germans removed this inscription from most demarcation stones or demolished them altogether. Nevertheless, several did survive the deliberate attempt to erase this part of history. However, these demarcation stones were never at the exact spot were the German Army was halted. One such demarcation stone was erected in front of Kemmel Hill, suggesting that the summit was never taken (Fig. 3.8). In fact, the Germans did seize the hill on 25 April 1918 and thus advanced several kilometres further than the monument implies.

Reconstruction works in Ypres started in the summer of 1919. This was made possible by the Belgian government, both financially and technically. By now, Germany was bankrupt and on the brink of civil war. The promised compensation was delayed and the rebuilding of the town was mainly financed by Belgian investments. Before construction could begin, tonnes of debris had to be removed. The actual reconstruction works started in 1921. In September 1923, the first 1,500 houses were rebuilt. One person in particular put his mark on the reconstruction of Ypres: Jules Coomans (*1871-†1937). Coomans was given free rein to rebuild, adorn and improve ‘his’ monuments the way he preferred, which led to the disappearance of many valuable architectural allocations. The reconstruction by Coomans was partly based on the drawings he had made when restoring the town in the early years of the 20th century.

79 Bender 1992, 735-736.
80 Chielens 1999, 221-230.
81 Dendooven 2006b, 99-101; Miles 2016, 55.
82 Meire 2003, 113 and 119-121; Misztal 2003, 60 and 79; Suleiman 2006, 1 and 167.
83 Forrest 1974, 308; Dendooven 2006b, 102.
Although Ypres is the main example of a reconstructed city, it is not a perfect copy of the medieval town. Like many other Flemish cities, Ypres used to have a beguinage, which was not rebuilt. The church for Sint Maarten was reconstructed, but without its chapel dating from 1623-1629. Of the three main cities in the Flanders frontline, (Newport, Diksmuide and Ypres) Diksmuide was damaged most severely and reconstructed in the least identical fashion. Of the three cities, this was the only town that was held by German troops for almost the entire war, which is why it was not possible to draw and take photographs of any building of the town before it was destroyed completely. Hence, identical reconstruction was impossible after WWI.84

While the memory of WWI is nation-specific, it also transcends national borders. However, it was the British Government that made the most effort to arrange a lasting commemoration of the dead. Because of this contribution, the landscape has become a primarily British commemorative landscape. The British Government used the memorials as a narrative of patriotism and glory, whereas relatives wanted to focus on grief and suffering.85

There is no doubt that the landscape of commemoration would have been developed quite differently if the Germans had won the war. On the former western front, several military cemeteries, constructed by the Germans during the war, still exist. Most can be found in the present-day sparsely populated Walloon region, in contrast to Flanders, which is densely populated, and serve as a reminder of the Battle of the Frontiers (1914). Saint Symphorien Military Cemetery (Fig. 3.9) provides good insight into how

---

84 Constandt 1999, 81; Dendooven 2006, 92.
85 Meire 2003, 25; Misztal 2003, 121; Suleiman 2006, 2 and 41.
Germany would have designed the military cemeteries. The opponent was buried in the same cemetery with equal honours and each regiment received its own commemorative stone. Officers and common soldiers were buried side by side, a practice copied by the Allies in the years after the war, when the cemeteries were set up. Flanders, on the other hand, contained over 670 German military cemeteries in 1919. Between 1925 and 1929, this number was brought back to 128 cemeteries and German soldiers were removed from most Allied cemeteries. From 1955 to 1959, the remains of German soldiers were concentrated at just four military cemeteries: Langemarck, Vladslo, Menen and Hooglede. Over 300 military cemeteries of the Commonwealth are located in Flanders at present, making the German presence much less visible in the landscape.

Directly after WWI, remembrance was focused on the fallen soldiers of the victorious nations. Veterans wanted to give a meaning to the war and their sacrifice, and those who actually experienced the war often had a far more inclusive approach to commemoration. The brutality of modern warfare was, for the most part, neglected. The ever-growing number of battlefield tourists, on the other hand, had other needs. Battlefield tourism had already started before the war was over. Between 1918 and 1939, the battlefields were visited by veterans and next of kin. In the early years after the war, far fewer German family members, less than 3%, were able to visit the grave or battlefield where their son, husband, brother or father had died.

86 Dewilde and Wyffels 2014, 41-46.
After the end of WWII, there was a cultural indifference to the previous world war. However, tourism increased again after the 50th anniversary of the end of WWI in 1968. The commemoration of the dead also shifted: they were not seen as ‘sacrifices’ anymore, but as ‘victims.’ Remembrance no longer focused on triumphs, but started to victimise the soldiers. Rather than dishonouring the fallen soldiers, this shift put greater emphasis on the memory of the common soldier.

The centenary of WWI (2014-2018) led to an explosion of attention. When tourism is boosted, the number of museums and monuments will inevitably increase as well. Several museums were renovated and new memorials were built, such as the Christmas Truce memorial near Messines (2014), a European football (UEFA) memorial near Ploegsteert (2014), the Welsh National Memorial near Langemarck (2015), the Chinese Labourers Memorial near Poperinge (2017) and memorial trees, symbolising the local front line of 1915-1917 at The Bluff (2015). Nowadays, even the German opponents are seen as victims. On 11 November 2014, a new memorial was unveiled at Notre-Dame-de-Lorette, a former battlefield in Nord-Pas-de-Calais. It commemorates all 575,606 known fallen soldiers in the region, including the names of over 147,000 Germans (Fig. 3.10). During the British and Belgian remembrance ceremonies to commemorate the Third Battle of Ypres in 2017, the Germans were included. The representation of the conflict has been reframed into a new narrative.

Fig. 3.10. The memorial to the missing soldiers from the battlefields of 1914-1918 in Nord-Pas-de-Calais at Notre-Dame-de-Lorette, France (Author).

89 Login 2015, 34; Miles 2016, 20 and 26.  
91 Savage 2009, 237 and 284; Login 2015, 120.  
92 Savage 2009, 176-177; Moore 2014; Login 2015, 120; Miles 2016, 26.
In contrast to Ypres, Berlin is a region that can be characterised as a diverse, complex and stratified historic landscape. The city was once situated at the very heart of Germany. From this central point of the German Empire (1871-1918), it was almost 600 km to Aachen in the west and about the same distance to Königsberg (present-day Kaliningrad, Russia) in the east. It is actually quite remarkable that the city evolved into a metropolis. Two little villages were established on both sides of a sandy riverbank, Cölln and Berlin. The name ‘Berlin’ was derived from the Slavic word ‘brl,’ meaning ‘village in the swamp.’ Berlin–Cölln did not have a productive hinterland, but was able to grow because of its location on the river Spree, an important trading route between Central Europe and the Baltic Sea. About 8,000 people lived there around 1400 AD, but by the time Berlin became the capital of Prussia (1701), the population had grown to 55,000 people. The historical layeredness of the city can be illustrated by the Potsdamer Platz, which bears a name that can be traced back to 1685, when it was a trading post just outside Berlin’s customs wall.

The Potsdamer Platz holds multiple histories (which cannot be discussed inclusively, as this goes beyond the scope of this chapter). The six-cornered traffic junction became an ever-changing symbol of Berlin. After the Franco-Prussian War (1870-1871), the German Empire was established. Berlin expanded rapidly and the Potsdamer Platz was now in the centre of a metropolis. In the roaring twenties, Berlin was the third-largest city in the world after New York and London. The Potsdamer Platz was a symbol of modernity and the metropolitan status of the German capital. The very first electrical streetlights of Berlin were placed here, as well as the first traffic light in Continental Europe. Shops, theatres, hotels, restaurants, cafes and wine-houses rapidly appeared, some of them even gaining an international reputation. One of the major hotels on this square was Hotel Esplanade, which had opened its doors in 1908. Kaiser Wilhelm II often organised ‘gentlemen’s evenings’ in a hall named after him: Kaisersaal. Amongst the famous guests who stayed at the hotel were Greta Garbo (*1905-†1990) and Charlie Chaplin (*1889-†1977). In July 1944, some of the officers involved in the failed conspiracy to murder Adolf Hitler (*1889-†1945) waited in this hotel for the code word Walküre.

The square was heavily damaged during WWII. The Potsdamer Platz was located near the Bendlerblock, which was used by several departments of the German Supreme Command of the Armed Forces, and Hitler’s New Reich Chancellery. Therefore, the area was an important military target for both the Red Army and the Allied bombers (Fig. 3.11). The combined British-American air raids almost completely reduced Berlin to rubble. Between August 1943 and March 1944, nineteen large-scale air raids were carried out, and allied bombers dropped a total of 17,000 tonnes of high-explosive bombs and 16,000 tonnes of firebombs. At least 9,390 civilians died in these attacks.

The air raids were followed up by the ground invasion by Soviet troops. The first artillery shells hit Berlin on Hitler’s last birthday on 20 April 1945. In the night of 25–26 April, Soviet troops entered the district of Neukölln in the southern parts of Berlin. From this day onward, the cruel urban fighting and large-scale rapes by Soviet troops also started here. Nearby the Potsdamer Platz, in the Führerbunker, the operator Rochus Misch (*1917-†2013) dialed random telephone numbers in the capital in order to track the advance of the Red Army. More than once, he witnessed the rape of German women when a call was answered. According to an estimate based on reports from the two largest hospitals of Berlin, at the very least 95,000 women in the city were raped by Soviet troops. A minimum of 10,000 women in the city died as a result of gang rape or because the victims committed suicide afterwards.
the victims were very young children, not older than 4 years, and very old women. However, victims of the Nazi-regime were also raped, including Jewish women and daughters of communists, sent by their fathers to the Red Army to help in their canteens and laundry works. These very large numbers are hard to comprehend, but each ‘number’ must have been an individual tragedy. More than 100,000 civilians died during the battle that ended on 2 May 1945. After the war, the Potsdamer Platz became a symbol of the devastation of the war.\(^9\)

During the Cold War (1947-1991), this square was the only place in Berlin where three occupying forces came together: the American, British and Soviet sector. In 1951, on the 80th birthday of Karl Liebknecht (*1871-†1919), the East German authorities erected a pedestal for the murdered socialist leader at the Potsdamer Platz. Here, on 1 May 1916, Liebknecht wanted to start a revolution and end the war. Remarkably, no attention was given to his working partner, Rosa Luxemburg (*1871-†1919), who was murdered at the same time. In the eyes of Soviet leaders, she was a controversial person due to her contacts with Lenin (*1870-†1924). However, the monument was never fully completed. Exactly

ten years later the Berlin Wall (1961-1989) was built across the Potsdamer Platz, which turned the square into a symbol of the divided city and clash of two cultures: East and West, communism versus capitalism.\textsuperscript{99} In the East, the only past allowed was a state-produced version that gave no attention to contested heritage. During the Cold War years, competing voices were abruptly silenced.\textsuperscript{100} The fall of the Berlin Wall heralded a revision of the past.

At the Potsdamer Platz, a lane of old linden trees and just two buildings survived WWII, the removal of pre-war buildings during the Cold War and the building activities after the collapse of the Soviet Union. One of them was the Kaisersaal, and the other was the Huth wine-house, which became known as the last remaining house on the Potsdamer Platz. It was constructed in 1911-1912, and because the storage room had to contain large numbers of wine barrels, the owner had chosen a steel construction, which was groundbreaking at that time. The first floor was home to a wine restaurant. Due to its strong steel frame, the building survived the bombing and the Soviet attack remarkably well. Simply because it survived WWII and the following Cold War, the building had become important enough to preserve. For this reason, Haus Huth has already been protected as cultural heritage by the West German authorities since 1979. It was one of the last examples of ‘modern’ corporate architecture of the ‘Belle Époque’ (1870-1914). When the owner died in 1967, Haus Huth was sold to the district of Tiergarten, which established apartments in the building. Shortly before the fall of the Berlin Wall, the Daimler AG business group had already bought large parts of the fallow area which had once been the Potsdamer Platz. After November 1989, the area became the city’s most disputed building site and was quickly nicknamed ‘Potsdaimler Platz.’ To save Haus Huth (Fig. 3.12), Daimler AG had to invest 50 million Euros.\textsuperscript{101}

The heart of the city had to be reconstructed on this \textit{tabula rasa}. Celebrated architects from all over the world were invited to present a design for a building at the Potsdamer Platz. Since the square had once been a symbol of the divided city, it now had to become a symbol of the reunification of Germany. It was decided that a ‘critical reconstruction’ should be preferred, which meant that strict rules applied to the reconstruction of the Potsdamer Platz: 20% of the buildings should be residential and the historic pattern of the main roads had to be respected.\textsuperscript{102}

The new Sony Centre had already been planned and the remaining Kaisersaal, which used to belong to the former Hotel Esplanade was in the way. During WWII, about 90% of the hotel was destroyed, and during the Cold War, the ruins were used several times as a movie set for movies such as \textit{Cabaret} (1972) and \textit{Der Himmel über Berlin} (1987). After a storm of protest, the decision was made to integrate

\textsuperscript{99} Remarque 2014, 109; Schneider 2014, 29.
\textsuperscript{100} Smith 2006, 81; Wertsch 2002, 73-74.
\textsuperscript{101} Remarque 2014, 109, 111 and 121; Schneider 2014, 29, 35-36 and 47.
\textsuperscript{102} Remarque 2014, 117-118.
the Kaisersaal into the Sony Centre, which required that it be moved about 70 metres, at a cost of 75 million German Marks.103

Symbols of the past can always be (mis)used as a powerful sign for both the present and the future. Societies change over time and so do attitudes towards their heritage. In general, the past is what one wants to remember. A dramatic sequence of events transformed both the material and the immaterial appearance of the Potsdamer Platz. Some histories were part of key moments of the identification of the German nation as well as for individuals and social groups. The ‘author’ of the landscape is generally the victor.104 The Soviet memorial of Tiergarten is located nearby, where an estimated 2,500 soldiers of the Red Army are buried. This monument quickly became known as the ‘Monument for the Unknown Rapist.’ Two T-34/76 tanks and two ML-20 152mm howitzers are placed prominently, supposedly the first to enter Berlin. When Russia annexed Crimea in March 2014, the inhabitants of Berlin suggested removing these tanks as a form of protest. However, this turned to be in conflict with a treaty signed after the exit of the Russian Army in 1991.105

The meaning and expression of multiple histories of this square changed through time, both for individuals, social groups and even the nation as a whole. Not much is left of the pre-war Potsdamer Platz: again and again, part of the history of this site was forgotten or even intentionally erased from the collective memory, before returning in a different form.106 When the reconstruction of the square began in 1995, the never-completed monument for Karl Liebknecht was removed. In 2002, however, the pedestal was returned. When the Berlin Wall came down, nobody wanted to be reminded of the Soviet era, but the wall has now been made visible again by means of ground markings. At the centre of the square stands a replica of the first traffic light.107 The meaning of the Potsdamer Platz and its symbolism have changed continuously. It contains many memories and histories, which sometimes contradict each other: it is a true multi-layered urban landscape of commemoration, but, first and foremost, the square is a symbol for the revival of Berlin.

103 Remarque 2014, 110; Schneider 2014, 47.
105 ANP 2014.
107 Remarque 2014, 111.
In the highly current and dynamic field of conflict archaeology, a topical review of the available and ever-growing literature on the subject can never be complete. For a set of relevant countries, namely the United Kingdom, Belgium (Flanders), France, Germany, Poland and the Netherlands, some of the most representative excavations have been selected for this chapter. This chapter delves into the following research questions: Which excavations have led to new insights? Which new techniques for researching conflict sites and finding casualties of war have been developed? Did these studies contribute to wider research agendas on memory and heritage? Several recurring themes can be noticed, including the archaeology of (historic) battlefields, the archaeology of camps, aviation archaeology, finding the famous and the involvement of the wider public. Not so long ago, legacies of war and conflict would have been ignored by most archaeologists. What are the motives for the archaeological investigation of these remains of a violent past today? What are the similarities and the differences between the countries discussed? How did these conflict archaeological studies in the relevant countries impact the Netherlands? And, more importantly, to what extent can the Netherlands benefit from techniques developed abroad?

In general, each paragraph describes the most prominent examples of conflict archaeology in the various countries in chronological order. When several studies coincide, they are presented in the chronological order of the conflicts in question: sites of the Thirty Years' War, are discussed before those of the Napoleonic era or WWI, for example.

4.1 United Kingdom

The Anglo-Saxon world is, without a doubt, a front runner in conflict archaeology. The long-lasting tradition of military history and the many wars in which the British islands were involved certainly contributed to the development and present popularity of conflict archaeology in the United Kingdom. Conflict archaeology in the United Kingdom often deals with the 'historic battlefields' of the 17th century through to the 19th century. However, British archaeologists do not only investigate conflict sites in their homeland, but also work abroad. A lot of conflict-related research in France, for instance, is conducted by British archaeologists, such as at Agincourt or the former frontline of WWI. Nevertheless, as discussed earlier, most conflict-related archaeological research remains focused on a national level.

During the Wars of the Roses (1455–1487), at least fifteen battles were fought in England. Although they were described in detail in historical sources, the exact location of some of those battles remains unknown. The archaeological excavations at the battlefield of Towton (29 March 1461), which started in 1996, confirmed and refined the traditional interpretation of the events. This was the largest battle ever
fought on British soil, with over 100,000 combatants and approximately 28,000 dead. During building works at Towton Hall, a first mass grave with the remains of at least 38 individuals was discovered by chance (Fig. 4.1). Conflict archaeology provides a broader perspective and analysis of military activities and their impact on landscapes, combatants and non-combatants than traditional or forensic archaeology. With regard to medieval warfare, archaeological research can be used to (1) identify some of the tactics used, (2) examine the nature and experience of warfare on individuals and landscapes and (3) explore some of the (new) archaeological techniques that have been used to recover evidence of (late) medieval warfare.

In 1997, the (medieval) battlefield of Towton was systematically surveyed by a multi-disciplinary archaeological team. The Towton Battlefield Archaeological Survey Project started by assessing the landscape. If the exact location of a battlefield is unknown, it is of the utmost importance to analyse the landscape features. By means of geophysical magnetic surveys, archaeologists looked for ferrous artefacts. However, this method was quickly found to be inefficient: once excavated, the artefacts were either unrecognisable or turned out to be recent contaminations. Field-walking surveys had the same result, which is why the decision was made to opt for a different research method and search for non-ferrous metals instead. Such artefacts are usually better preserved and therefore more easily identified.

7 Sutherland and Holst 2005, 33; Sutherland 2009, 110; Foard and Morris 2012, 85.
8 Capps-Tunwell et al. 2015, 233-234.
9 Sutherland and Holst 2005, 33-34; Sutherland 2009, 110.
An important component of the investigation was the search for historically documented mass graves. Ultimately, it turned out that non-military findings, like clothing fasteners and buttons, were actually much better indicators of areas of conflict than military artefacts. Concentrations of such finds formed a specific pattern in the landscape. All metal finds were, like the finds at Little Bighorn, Montana, separately numbered, bagged and fixed to their respective locations with a handheld navigation device, when a total station was not available on site. Private collectors, who searched the battlefield with permission of the landowner, also helped with the Towton Battlefield Project. During a metal detecting survey, the lower part of a human arm bone and two human teeth were found. During a trial trench excavation, hundreds of disarticulated bones were recovered which were related to the battle. It is the only battlefield in the United Kingdom for which mass graves have been located by means of modern archaeological methods. The discovery of these (disturbed) mass graves and the concentration of artefacts provided overwhelming evidence for the location of the Towton battlefield.10

The Battle of Bosworth (22 August 1485) was also investigated by archaeologists between 2005 and 2010. Historical sources of the event were consulted and a historic terrain reconstruction was conducted. Again, the exact location of the battle was not known. The medieval landscape was reconstructed by means of documentary research as well as archaeological fieldwork, with the metal detector once again playing an important role. The most notable and exceptional find was a late-15th-century silver heraldic badge in the shape of a bird.11

Evidence for the battlefield itself, however, was only found at the very last stage of the survey. In 2009, pieces of lead were found that could only be linked to the use of artillery during the battle. A fragment of a silver gilded heraldic badge of a boar was also discovered, the symbol of King Richard III, who was killed on the battlefield. This must have been worn by a member of the court circle. The artillery rounds, the boar badge and some sword fragments were sure evidence for the location of the battlefield.12

For a very long time, the grave of Richard III (*1452–†1485) was also lost. Since he had been immortalised by William Shakespeare (*1564–†1616), Richard III remained a highly controversial figure with a strong cohort of modern-day supporters. According to historical sources, King Richard’s naked body was brought to Leicester for public display. Afterwards, his body was interred in the medieval church of the Friars Minor. In 1538, the friary was dissolved and the buildings were demolished soon after.13

The public pushed for an archaeological investigation, which was carried out by the unusual combination of professional archaeologists, the Richard III society and the City of Leicester. The main aim was to locate the Grey Friars Church, but this investigation ultimately resulted in the discovery of the grave with the remains of Richard III. Although the archaeological specialists had deemed it almost impossible to locate the grave beforehand, an excavation would at least make a major contribution to the knowledge of medieval Leicester.14

In 2011, a desk-based survey was conducted, with the excavation starting a year later. Key aims were to find evidence for medieval buildings and understand their location on the site. Little is known about the 43 years of the friary’s existence. Beneath the choir – a high-status position reserved for important individuals – human remains were found. According to contemporary sources, Richard III was buried quite hastily, which is supported by the archaeological evidence. The grave was too short for the body, which meant the head was placed in an abnormal, propped-up position. There was no evidence for the use of a shroud or coffin either. As a result of a later disturbance, the feet were missing, but the overall condition of the remains was very good. Forensic investigation demonstrated that this male person had a high protein diet, suggesting high status, and died while in his late 20s to late 30s, compatible with

12 Foard 2004, 10; Foard and Morris 2012, 93 and 95.
13 Buckley et al. 2013, 519–520.
14 Buckley et al. 2013, 520–521.
Richard’s known age at death of 32. Fatal wounds were inflicted by a halberd and a sword underneath the back of the skull. Initial analysis of the DNA revealed a match between the human remains and two known descendants of Richard III. On 26 March 2015, the remains of Richard III were reburied in Leicester Cathedral. Above all, this investigation proved that academics, local authorities and amateur enthusiasts can collaborate on a high level.15

Industrial warfare has a completely different archaeological imprint than previous, pre-industrial wars. One of the first archaeological studies on modern conflict by British archaeologists was conducted near Givenchy-lès-la-Bassée in northern France in 2006. Geophysical and radar techniques were used to locate mine craters and tunnels. A new monument was to be erected in the vicinity of the ‘Red Dragon’ crater, a large German mine detonated on 22 June 1916 under the British frontline. Sapper William Hackett (*1873-†1916) was buried alive when he refused to leave a wounded comrade behind minutes before the tunnel collapsed. For his actions he posthumously received the highest British award for valour, the Victoria Cross (VC). It was the only VC awarded for actions underground during the war.16

A monument was unveiled in 2010 near the location of the British mine entrance (Fig. 4.2). In order to do so, the location of the shaft had to be established as near as possible. This was accomplished by means of a geophysical survey. The crater is still visible in the landscape, taking the shape of a small dip. Since the area is full of metallic objects, magnetometry was of no use. A total of fifteen grids were

---

15 Buckley et al. 2013, 523-524 and 530–531, 533 and 536–537.
16 Pollard and Banks 2007, xii; Banks 2014, 165-166.
surveyed, covering 6,000 m² and including the crater itself. This survey demonstrated the effectiveness of resistivity surveying, despite the extent to which the soil had been disturbed by the war.\textsuperscript{17}

Earlier, in 2003, a small-scale excavation was already carried out at the Somme, France, funded by British media. The British Broadcasting Corporation (BBC) wanted to produce a television programme about sites which were connected to the famous British poet Wilfred Owen (*1893–†1918) and therefore sponsored an archaeological investigation near the village of Serre. In February 1917, the poet is supposed to have lived in a shelter nearby. Eventually, the remains of three soldiers were found, in which the BBC was not very interested. Uniform parts determined their nationality: one British and two Germans. The German soldiers were identified, whereas the British soldier remained unknown. Although the pre-excavation survey techniques turned out to be insufficient, the archaeologists did develop techniques to excavate human remains of WWI.\textsuperscript{18} Such contested excavation sites often become new places of remembrance themselves.\textsuperscript{19} Especially with regard to German soldiers of WWI, identification can be difficult. Although the German Army issued their troops with metal identity discs earlier than the Allied troops, primary documentary is usually lacking since most war diaries and personal records of WWI were destroyed by the Allied bombings of Potsdam in 1945. Personal artefacts were of much importance when it came to identifying the two German soldiers. A small monument was erected at the spot where the remains were found. Media certainly played a role in the shift of awareness amongst archaeologists and most traditional archaeological funding agencies would not have supported such research from the beginning.\textsuperscript{20}

On 19 July 1916, Australian troops launched their first attack on the western front near the village of Fromelles in northern France. This was a battle of immense importance in Australian history: resulting in over 8,000 deaths, of which approximately 1,600 missing persons, this was the greatest loss of life ever in a single battle fought by the new-born nation. On 1 July 1916, a combined British-French offensive started at the Somme, further south. The battle at Fromelles was meant to be a diversion attack to pin down enemy troops so that they could not be used as reinforcements at the Somme. The Battle of Fromelles turned out to be a disaster. Most of the dead could not be collected from No Man’s Land. The German Army buried a number of bodies behind their lines near Pheasant Wood. After the war, V.C. Corner Australian Cemetery was built in what used to be No Man’s Land. Between November 1918 and December 1919, a total of 410 individuals were recovered in the area. None of them could be identified. Still, a large number of soldiers (1,299) were missing. Aerial photographs, taken shortly after the battle, reveal several newly dug mass graves, which were forgotten after the war. The Germans were defeated and by the time of the Battle of Fromelles the village had already been evacuated. When the inhabitants returned, they knew nothing of the existence of the graves nearby.\textsuperscript{21}

The Fromelles project was funded by the Governments of Australia and the United Kingdom, rather than by media. As a result, the project had to deal with various restrictions: none of the photographs or field drawings of the mass grave were to be published. The main objective of the field survey, conducted in 2007, was to locate the mass graves and to check if the human remains were still present. During this non-invasive survey, methodologies for conflict-related archaeological research were developed as well. An integrated research methodology was used, combining topographic, resistivity, ground penetrating radar and metal detecting surveys, supported by archive research. Each element made its own contribution. During the survey, three important artefacts were found that indicated an undisturbed mass grave: several cap badges were discovered of both the Australian and New Zealand Army Corps (ANZAC) and

\begin{itemize}
\item Pollard and Banks 2007, xii; Banks 2014, 167-168, 170 and 173.
\item Fraser and Brown 2007, 147.
\item Holyoak 2002, 658-662.
\end{itemize}
of the Australian Imperial Force (AIF). Metal detectors searched the area thoroughly as well. In several layers, British shells were found in situ. which were fired during the final offensive of the Allied forces in August 1918. The Fromelles project provided an ideal case study to test the potential for the use of metal detectors on sites related to modern warfare.  

In 2009 an archaeological excavation started on the edge of Pheasant Wood at Fromelles, carried out by Oxford Archaeology. Nearby the mass graves, laboratories, offices, storage space and even a temporary morgue had been built. Four pits, constructed by the Germans, were uncovered. One was empty, but the other three contained the remains of 250 individuals and over 6,200 artefacts. In contrast, at the former western front, approximately ten individuals are found each year. A mass grave with such numbers was indeed exceptional. The human remains were examined for age, length, trauma, diseases and cause of death. 

The discovered artefacts were in remarkably good condition. Among other things, a leather belt, a wallet and a shoe with the remains of a sock were found. The wallet contained several different curren-
cies: two British, three French, one Dutch (!) and eight Turkish coins. Most likely, this individual was a veteran of the Gallipoli Campaign (25 April 1915-9 January 1916) and, indeed, a collector of coins. A special find was a fountain pen that was still in working condition after more than 90 years underground. Another remarkable artefact was a paper return ticket, second class, for Fremantle-Perth, and an English-French dictionary and a bible with underlined passages were also unearthed. Another soldier carried a lock of hair (perhaps of a woman?) in a leather, heart-shaped pouch on his chest. This was just one of the artefacts which must have been of important emotional value for the owner. 

Fig. 4.3. Fromelles (Pheasant Wood) Military Cemetery (Author).
Some of these personal artefacts helped the identification process. An important goal of the excavation was to identify as many individuals as possible. Next of kin in Australia and England of soldiers missing in action at Fromelles were approached to give their DNA. For the first time, the technique of DNA profiling was used to identify a large group of very old human remains.\textsuperscript{25} However, the excavation has also been criticised. The excavation had to comply with a strictly defined timetable, composed by the British and Australian Governments. The research had to be completed before 19 July 2010, the 94th anniversary of the battle. Experienced Belgian amateur-archaeologist Johan Vandewalle was worried about the methods used. His chief anxiety was that the archaeologists were going into depth in the centre of graves instead of working meticulously layer by layer. Remains might have been jumbled in this way. He was also concerned about the drainage system. Oxford Archaeology won the tender with a bid of about £1.4 million. Birmingham University and Glasgow University both estimated the costs of the project at around £2.4 million, but did include a better drainage system, required because water might destroy identifiable DNA found on bones. It is possible that some individuals have not been identified because their DNA was washed away during the archaeological survey.\textsuperscript{26} A total of 144 individuals have been identified, most of whom were Australian soldiers. All remains have been reburied at the newly constructed cemetery, Fromelles (Pheasant Wood) Military Cemetery (Fig. 4.3). This was the first new Commonwealth War Graves Cemetery to be constructed after WWII.

The excavation of mass graves is just one aspect of conflict archaeology. Defence structures are another category and those related to WWII are not only limited to the European mainland. Public interest for this specific type of heritage has steadily increased over the last decades.\textsuperscript{27} During the Defence of Britain project (1995–2005), bunkers and other anti-invasion structures were documented and mapped under the management of the Council for British Archaeology. The main goal of this project was to map the 20th-century military landscape of the United Kingdom with a view to the future preservation of any surviving structures.\textsuperscript{28}

Defence structures can be organised into various categories, including concrete bunkers, airfields, roads and harbours. It was important for the project to establish the condition of these structures. The records were divided between ‘Anti-Invasion’ (the defence works built between 1940 and 1941 against the threat of a German invasion) and ‘Non-Anti-Invasion’ (all other categories of 20th-century military sites). The coast of the English Channel was defended particularly heavily against a German invasion, but some of the defence structures had already been demolished in 1943 in preparation for Operation Overlord (6 June–30 August 1944), the amphibious assault on Normandy, France. Despite the relatively young age of the structures, very little was known about the defence works.\textsuperscript{29}

The Defence of Britain project showed clearly the large differences in terms of how well the various structures had been conserved. Concrete and steel are more resistant to the rigours of time than earthwork field fortifications supported by wood (like trenches). The study also indicated a clear under-representation of most familiar defence structures. For instance, historic sources account for 2,270 Anti-Aircraft positions in the United Kingdom, but only 1,190 were localised in the landscape.\textsuperscript{30}

Approximately 17,000 field visits were conducted by nearly 600 volunteers to sites throughout England, Wales, Scotland and Northern Ireland. Over 20,000 structures were registered and entered into a database. The objective of this database was to make it easier to decide, both at a local and a national level, which structure(s) should be preserved. Many structures were in poor conditions, as these defence structures were obviously not meant to last forever. These studies led to new insights with regard to the defence of the United Kingdom during WWII. First of all, it visualised the militarised landscape and

\textsuperscript{25} Summers 2010, 31–32 and 54; Skully and Woodward 2012, 60.
\textsuperscript{26} Toebosch 2009.
\textsuperscript{27} Schofield 1998, 10; Carman 2013, 8.
\textsuperscript{28} Dobinson \textit{et al.} 1997, 288; Schofield 1998, 7 and 10.
\textsuperscript{29} Dobinson \textit{et al.} 1997, 288; Schofield 1998, 5 and 7; English Heritage 2003, 3-10.
\textsuperscript{30} Schofield 1998, 2-3 and 6; English Heritage 2003, 3-10.
the complexity of the design of the defence system. Second, during the years 1940-1942, the defence structures were constructed in a very organised fashion and not, as assumed, at random. Third, this study improved our understanding of the various military sites. Furthermore, in the United Kingdom, the Defence of Britain project was regarded a constructive link between amateurs and professionals.  

Beside the primary defence structures in the United Kingdom, there are also several important sites with a connection to Operation Overlord. Three main categories can be distinguished: (1) Mulberry harbours, (2) maintenance- and reparation areas and (3) embarkation areas. The most famous Mulberry harbour is without a doubt the one at the coastline of Arromanches, Normandy (Fig. 4.4). However, Mulberry harbours are also present at the coastline of the United Kingdom, though they are usually at the bottom of the sea. Reparation areas are generally under-represented since landing crafts were often repaired at improvised garages which leave little archaeological evidence. A total of 68 embarkation areas have been located. These sites are not only of importance for the United Kingdom but are part of the international heritage of WWII with regard to D-Day and the liberation of Europe.

Aviation archaeology is another subdivision of modern conflict archaeology. Crash-sites can contain vital archaeological information. For instance, during the Battle of Britain (10 July–31 October 1940), at least 576 airplanes crashed over the United Kingdom. Since 1982, approximately 250 (43.4%) have been located.

---

32 A Mulberry harbour was a prefabricated, temporary portable harbour developed by the United Kingdom. These harbours facilitated a rapid offloading of military supplies until a French port was captured. The initial lifespan of such temporary ports was thought to be three months.

33 Schofield 2001, 78-82.
34 Carman 2013, 10-12; Deal et al. 2015, 3.
already been excavated. However, most were excavated by amateurs. Although metal detectorists and other enthusiastic amateurs have often tried to research conflict-related sites as responsibly and ethically as possible, most of such work remained fragmented and was not always reliable. A crash-site is to be considered an exceptional class of archaeological site, as the plane wreckage is not part of an archaeological site – it is the site in itself. Therefore, with the removal of the object, the complete archaeological site with all its (context) information, will vanish. Degradation of the wreckage means degradation of the archaeological site altogether.

In recent years, aviation archaeology is emerging as an acceptable area of academic study. Although this branch of conflict archaeology is usually associated with the recovery of downed aircraft, surveys also look at testing facilities, factories, airstrips, terminals, hangars as well as aircraft wrecks and crash-sites. The condition of the plane wrecks depends on the type of aircraft, the material used, the crash conditions and the type of soil on site. As a rule, WWII airplanes are better preserved than those used during WWI. During WWII, airplanes were mainly built from wood and linen, which remains are preserved for much less long than aluminium. From 1919 until 1936, the Royal Air Force used 48 different planes. Of 36 of these planes (75%), no (intact) examples are preserved. A total of 93 airplanes were employed by the RAF during 1937-1945. For 21 of these models (22.5%), not a single one has been preserved. This is quite remarkable, since some of the planes were produced in rather large quantities during the war. Between 1940 and 1945, around 10,000 airplanes crashed over the United Kingdom, of which about 1,084 crashed for non-operational reasons. Approximately 1,500 belonged to the German Luftwaffe. For long, there was little awareness regarding the potential of archaeological research into crash-sites, but since 1986 amateurs have been prohibited from conducting such excavations by law in the United Kingdom.

In 2012, a rare prototype of a German Junkers Ju 88T bomber was recovered by archaeologists during dredging works for the new London Gateway Port. It was shot down while on reconnaissance patrol by the Norwegian ace Marius Eriksen (*1922–†2009) in 1943. Dredging works already started in 2001 and were finished in 2014. Archaeological sites (at sea) which were likely to be affected were investigated. Side-scan sonar and magnetometer surveys were conducted by Wessex Archaeology. Regulations did not require a manual excavation and therefore the removal of the wreck was carried out by a large grab dredger, a choice made for economic reasons. The recovered parts turned out to belong to a rare Ju 88T prototype. The only known loss of such an aircraft near the British coast was reported on 2 April 1943.

4.2 Flanders

Besides its ‘traditional’ heritage, Flanders has another influential and specific past: it contains the former battlefields of WWI. The speed of the reconstruction of both the landscape and its villages and towns, started in 1919, paradoxically preserved many landscapes of war remarkably well. Craters were quickly filled up and not much time was spent in cleaning the battlefields of their material remains. Material ranging from the human remains of participants to ammunition, weapons, tools, personal belongings, craters, dugouts and trenches are often hidden just a few centimeters below the surface.
In the 1990s, various amateur archaeological groups were formed in Flanders as a response to growing battlefield tourism. *The Diggers* are probably the most famous. Between 1998 and 2002 *The Diggers* conducted a rescue excavation near the Boezinge Canal on the outskirts of Ypres, ahead of an industrial development project. A total of 156 human remains were discovered, a remarkably large number on a relatively small site. Additional historical research indicated that most of these soldiers were killed in action during an almost forgotten military operation, started by the British on 6 July 1915. Many of the bodies were left behind in No Man’s Land. Most of the discovered human remains were incomplete, as the bodies had remained untouched and in the same place for months or even years, exposed to the elements and artillery fire. Almost 50% of the discovered human remains were British. One third were German soldiers, the remaining number were French. Only one of the 156 soldiers was positively identified, a French soldier of the 3rd Zouaves, François Metzinger, killed on 21 May 1915.46 A part of the site, known as the Yorkshire Trench, has been preserved and is nowadays accessible for the public (Fig. 4.5). *The Diggers* became internationally known when British television channel ITV accused the members of treasure hunting and grave robbing in 2001. As it turned out later, these accusations were incorrect.47 Where human remains are involved, important ethical questions naturally arise, and issues like respect for the dead are of much greater ethical significance in the communication of research findings than the very study itself.48 The British public raised an important question: did these established, but non-professional, archaeological groups handle human remains with the appropriate respect and technical skill?49

---

46 Dekker 2003, 41.
47 Saunders 2002, 104.
49 Saunders 2002, 103-104; Van der Schriek and Van der Schriek 2014, 238.
At present, conflict archaeology plays a vital role with regard to the preservation of these fragile features and artefacts. Much material has been lost by natural processes of decay as well as through building development and even illegal digging by some militaria collectors and dealers, including by some metal detectorists.50 Archaeological and geographical research into features of WWI is not only interesting but also necessary. After more than a century, the wooden supporting beams in tunnels and dugouts are completely rotten and can collapse, damaging any buildings on top of it. According to British military historian Peter Barton, an expert on military mining, these tunnels and dugouts are a clear and present danger. By surveying such underground sites, archaeologists may develop a methodology for the detection, consolidation and preservation of these features.51

In 1999, for instance, a crownhole revealed a well-preserved dugout near Zonnebeke, named Beecham Farm on contemporary maps. An archaeological survey was carried out by the amateur archaeologists of the Association for Battlefield Archaeology in Flanders (ABAF). Some parts of the farmhouse had already collapsed in 1991 and again in 1992, but no reasons were found. The dugout and its structure were intensively surveyed and recorded. The collected artefacts were archived and contextualised and the dugout itself completely removed. The investigation showed that the dugout had already collapsed during the war at least three times but was repaired each time.52

The Beecham Farm dugout was shaped like a T, featuring an entrance at each ending. The ground floor was constructed with an incline to drain the underground water easier. The dugout was not a cut-and-cover construction, as expected, but had, in fact, been mined. This indicated that this shelter was not a common British but a rare German dugout, which was also shown by the fact that no steel was used in its construction. The unusual shallow depth of the dugout, no more than two meters on average, suggests that the dugout was originally German, dating from pre-1917. Numerous artefacts, however, imply that it was also occupied by the British. The Beecham Farm dugout is only the third German dugout known in the region and is certainly the first to have been comprehensively examined. In recent years, there has been more attention for underground warfare. Although thousands of tunnels and dugouts litter the landscape in this part of Flanders, very little is known about them.53

Since 2003, several conflict archaeological excavations have been carried out by professional archaeologists in Flanders as well. The professional archaeological interest in the remnants of WWI has mainly resulted from road construction works.54 The archaeological investigation conducted before the planned extension of the A19 motorway led to some important insights with regard to the archaeology of WWI. A few years earlier, these war remnants would definitely have been ignored. Prior to excavation, some important research questions were formulated: what was the extent and state of preservation of the archaeological heritage in the area? How many human remains can be expected on a former battlefield? What would be the extent of the damage to these features if the motorway would be constructed on the planned route?55

The Institute for the Archaeological Heritage of the Flemish Community56 was ordered by the Flemish government to conduct a detailed archaeological evaluation along the total length of the planned A19 highway, which was to be 7 kilometres long and 100 metres wide. The objective was to search the subsurface for archaeological remains of WWI and other periods. Should the area be considered for pro-

---

50 Dewilde et al. 2004, 3; Van der Schriek and Van der Schriek 2014, 229.
51 Pollard and Banks 2007, xiii.
53 Doyle et al. 2005, 64–65; Saunders 2007, 151; Dowling 2008; Banks 2014, 156.
54 Dewilde et al. 2004; Saunders 2001; 2004, Carman 2013, 8 and 17.
56 Vlaams Instituut voor Onroerend Erfgoed (VIOE).
tection as an important heritage site. Preliminary research started in 2002, but no methodology had been developed for modern conflict-archaeological research at the time, in spite of earlier excavations by amateur-archaeological groups. At first, desk-based research was conducted, during which archives were consulted and the former frontline was mapped in detail. This study was followed up by several field surveys, recording artefacts collected on the surface as well as any subsidence. Crownholes, for instance, are often an indication for the presence of tunnels and dugouts.

All the data from the field surveys were entered into a GIS program, after which find concentrations were compared with the maps made earlier. This led to the emergence of clear parallels (Fig. 4.6). To assess the potential impact on WWI’s archaeological heritage in Flanders, nine locations were selected for excavations. This study shed new light on the evolution of trench constructions from 1915 to 1917. During the excavations, a clear distinction could be made in the setup of British and German trenches, with the latter being much more solidly built. The contrast between the trenches had long been pointed out by military historians and contemporary photographs, but this was actually the first time it was verified archaeologically.

![Fig. 4.6. Archaeological features at the planned site of the A19 motorway near Ypres (Redrawn after Meyer 2006, 61).](image-url)
One of the main categories of artefacts was live ammunition. In Flanders, it is common to request a digging permit for sites where archaeologists are likely to find ammunition. As soon as unexploded shells are actually unearthed, the archaeological team has to inform the Flemish explosive ordnance disposal (EOD) squad (DOVO), who will remove the explosives from the site. When human remains are discovered, the police have to be informed, and legal procedures have to be followed. However, crucially, the excavation is allowed to continue. Some British-led projects, notably the Plugstreet Project now have their own EOD cover to liaise with Flemish EOD and undertake health and safety cover on site and forensic archaeologists who work in very close cooperation with not just the DOVO and the Belgian Authorities, but the Commonwealth War Graves Commission, the Volksbund Deutsche Kriegsgräberfürsorge and the French Service de Pension.

The site named Turco Farm by British troops was of great historical importance because it was nearby the spot where the Germans used gas as an assault weapon on the western front for the first time (22 April 1915). Human remains of a British soldier were also discovered. The nationality was determined by means of the recovered boots and several uniform buttons. He was between 25 and 30 years of age at the time of death. A little later, the remains of a French soldier were also discovered. Again, his nationality was determined on the basis of the buttons on his uniform. This soldier was around 30 years of age.

At the Cross Roads site, several human remains were also found. This site was a British sector for most of the war and was first set up after the Second Battle of Ypres (22 April–25 May 1915). At Cross Roads, a rather large excavation was carried out, in contrast to the other eight selected sites. A total of six British soldiers were found, three of whom had most likely died during an attack. Two soldiers belonged to the Royal Sussex Regiment. One soldier carried a Webley revolver (.455, Mk.VI), which meant that he had most likely manned a machinegun, since Webley revolvers were not standard issued to ordinary soldiers. Only officers and machine gunners carried them. Another soldier belonged to the Northumberland Fusiliers, but none of the soldiers could be identified by name.

The excavated trenches at all selected sites clearly showed constant activity during the war. In the earliest stage, the British trenches were dug in a north-south direction. Some parts were later abandoned, and other segments were reinforced. The British troops also started using a different type of duckboard later in the war. At several places, the trenches of 1917 crossed older parts, which were significantly smaller than the more recent examples.

Cross Roads in particular received a lot of attention from the wider public and played an important role in forming an image of the horrors of WWI, as well as becoming an important place for pilgrimage too. Paradoxically, professional archeological research was driven by the wider public’s increasing archaeological interest in this era. In turn, academic research questions prompted further interest on the part of the general public. As explained in the previous chapter, the public does not simply absorb heritage, but also influences developments in museums and conservation movements. Hundreds of interested people, mainly British, visited the site and indicated that they felt more connected with the past here than anywhere else on the former battlefield. Both visiting and experiencing this heritage site was of fundamental significance for the visitors. The excavations underlined the importance of these archaeological

---

60 DOVO: Dienst voor Opruiming en Vernietiging van Oorlogstuig.
61 Hendriks et al. 2004, 54.
63 German War Graves Commission.
64 Van der Schriek and Van der Schriek 2014, 232.
66 Hendriks et al. 2004, 55; Silberman 2004, 28; De Meyer and Pype 2004, 7-8; Saunders 2007, 160
67 De Meyer and Pype 2004, 7-8, 20 and 23.
traces and highlighted that the war's physical remains should be regarded equally important as the area's better-known prehistoric and medieval cultural heritage. In February 2004, the Central Archaeological Inventory (CAI) started with a new project to follow up the excavations. The main goal was to take stock of all WWI-remains in the former Ypres Salient, in an important recognition of both public and political interests for modern conflict archaeology. This study proved that it was possible to investigate recent battlefields in a scientific way.\textsuperscript{71}

Archaeological remains of WWI are now considered an integral part of national heritage. In 2011 and again in 2013, excavations were carried out prior to building development projects at a former German cemetery near Beselare-Zonnebeke. This military cemetery had already been constructed in October 1914, next to the local church. Most soldiers buried at the cemetery of Beselare belonged to the \textit{Württembergische Reserve-Infanterie-Regiment 246} and died during 1914 and 1915. The soldiers had explicitly stated their wish for individual graves. After WWI, German military graves in Flanders were concentrated at just four military cemeteries, as described in the previous chapter. During the excavations, a total of 120 (former) graves were investigated. How well were the bodies exhumed? Most bodies must have been buried without a casket or body bags due to the considerable number of artefacts collected. Only in two graves were the remains of a simple wooden coffin unearthed. Military equipment and regimental epaulettes were frequently found. A map of the original cemetery was discovered in an archive too, which let researchers link many artefacts to individual graves and soldiers. The archaeologists concluded that the graves had been cleared quite well. Only 10\% of the graves contained small bone fragments, and the discovery of two complete skulls served as quite exceptional finds.\textsuperscript{72}

Excavations are not always necessary for proper conflict archaeological research. Remote sensing data hold great potential with regard to the study of recent military landscapes and demonstrate perfectly how archaeology can provide new insights.\textsuperscript{73} Image warping has led to the identification of numerous WWI structures in Flanders.\textsuperscript{74} Over the course of three years, another non-invasive survey was carried out near the \textit{Chemin du Mont de la Hutte} at Ploegsteert. The site was mapped by means of aerial photographs, ground penetrating radar and historical landscape analyses, comparable to the techniques used at Fromelles.\textsuperscript{75} A magnetometer penetrated the surface down to a depth of about half a meter, just beneath the plough soil. After the radar images were analysed and research was compared with the known historical aerial photographs, it turned out that about 80\% of the trenches were still present in the investigated area. This can be significant information for later spatial developments or the preservation of these remains. Geophysical investigations showed that many trenches are very well preserved just below the surface.\textsuperscript{76}

The popular perception of warfare on the western front is dominated by the picture of a wasteland of death and despair. However, the frontline was in fact a narrow corridor and life went on relatively normally in the civilian settlements behind both lines.\textsuperscript{77} Conflict archaeology means more than 'counting bullets' and excavating battlefields. During WWI, the city of Aalst was occupied by the German Army. Although not in the frontline, it can still be considered as a conflict zone. In 2012, archaeologists excavated a cesspit at Leopoldstraat 42. From December 1910 until August 1917, a widow lived in the nearby house, together with her son and daughter. The archaeologists were able to reconstruct the food pattern of civilians of the lower social classes during the war. Strikingly, civilians managed to consume seafood like periwinkles and clams this far inland. The daily menu hardly contained any meat: gammon
and pork were completely absent. Cats and rabbits, possibly poached, were eaten instead. Leftovers of freshwater fish were also found, mostly eel and carp. All specimens were very small and probably caught by local fishermen.\textsuperscript{78}

Although Flanders is most famous for its WWI excavations, archaeologists now also pay attention to WWII. Germany invaded the Low Countries on 10 May 1940. Bridges were of the utmost importance for a quick advance of the troops. \textit{Hauptmann}\textsuperscript{79} Walter Koch (*1910-†1943) was responsible for the capture of the Fortress of Eben-Emael and the bridges over the Albert Canal at Veldwezelt, Kanne, and Vroenhoven. All targets were taken by his \textit{Fallschirmjäger-Sturm-Abteilung “Koch.”}\textsuperscript{80} Only the bridge at Kanne was blown up by the Belgian defenders.

The bridge at Vroenhoven had a main defence system of three concrete bunkers interconnected with trenches. German parachute troops attacked the bunkers from the rear at 04:15 hours. After just fifteen minutes, the bunkers were captured and the bridgehead was secured. In 2014, archaeologists excavated the site and discovered features from the Neolithic, the Bronze Age, the Iron Age as well as WWII. The archaeologists were accompanied by a private EOD company. The added value of the excavation was major, making a significant contribution to historical sources.\textsuperscript{81}

A total length of 932 running metres of trenches was excavated (Fig. 4.7). Over 120 artefacts related to the 1940 battle were discovered. The larger part of these artefacts belonged to the Belgian troops present at the site, including a rifle, a bayonet, a helmet, bullets, shoes and uniform buttons. The artefacts

\textsuperscript{78} Ervynck \textit{et al.} 2014, 50-51.  
\textsuperscript{79} Captain.  
\textsuperscript{80} Koch Parachute Assault Battalion.  
\textsuperscript{81} Verdegem and Loopik 2014, 84-85.
painted a picture of living conditions in these trenches, and the archaeologists also gained better insight into the daily life, nutrition and gear at this outpost. Empty water bottles, beer bottles, spoons, forks and cans were found as well.82

The German artefacts showed that the Parachute Assault Troops attacked the Belgian trenches with great efficiency. The Belgian defence systems were designed to withstand a regular infantry attack and
were not prepared for an aerial invasion (Fig. 4.8). However, the Germans did need aerial support to secure their victory. During the excavation, four 50-kilo bombs, belonging to a Junkers Ju 87, were unearthed as well. None of the bombs had exploded, since they were not activated by the pilot before they were dropped. The distribution of the bombs allowed researchers to reconstruct the approach route of the airplane.\footnote{Verdegem and Loopik 2014, 87.}

Aviation archaeology is also gaining more attention in Flanders. In the 1980s, some airplanes were excavated, usually by amateur archaeologists, similar to the situation in the United Kingdom – as discussed earlier.\footnote{Verdegem and Loopik 2014, 88-89.} In 1996 the Belgian Aviation History Association (BAHA) was established and it was decided that crash sites should be investigated more properly, as these sites can contain information about the conditions of the crash. Crash sites are also a unique archive of the rapid evolution of airplanes during WWII. Since 2004, amateur aviation archaeologists and professional archaeologists have been working more closely together on the recovery of the remains of WWII aircrafts.\footnote{Deal \textit{et al.} 2015, 11.}

4.3 France

Ironically, nothing will bring back the past for the general public more vividly than the remains of a human being. In the process of recovering a body, history is brought back to life, especially if the deceased can be given a name.\footnote{Verdegem and Loopik 2014, 88-89.} The most famous recovered and identified missing soldier in France is without a doubt the writer Henri-Alban Fournier (*1886—†1914). Fournier was born on 3 October 1886 in La Chapelle d’Angillon, a small village in the department of Cher, 30 kilometres north of Bourges. In 1913, his novel \textit{Le Grand Meaulnes} was first published under his pseudonym Alain-Fournier. In August 1914 Alain-Fournier was called to arms, promoted to the rank of Lieutenant and added to the 288th Infantry Regiment. He received his baptism of fire during the first Battle of the Marne (5–9 September 1914).

In the night of 21 to 22 September, Fournier and his men were installed at an outpost at the front near Vaux-les-Palameix. The infantry attack started at 07:00 hours. That day, Alain-Fournier and twenty of his fellow soldiers disappeared without a trace.\footnote{Holyoak 2002, 657; Scott and Gane 2015, 79.} Soon, many rumours arose, as was common during the first months of the war, that Alain-Fournier had not been killed at all. Instead, people assumed that he had disappeared mysteriously, just like the main character in his book, and was still alive. According to another, more sinister legend Alain-Fournier and his men were not killed in action, but in fact executed by the Germans.\footnote{Van der Laarse 2017.}

In 1977 Michel Algrain, not an historian or archaeologist but an admirer of Alain-Fournier, started a quest which would eventually last more than fourteen years. At the German Military Cemetery of Troyon, he found his first clue. Algrain discovered the graves of eight medical orderlies who died in the forests of Saint-Rémy-la-Calonne on 22 September 1914. In 1989, a German man named Claude Regnault, helped Algrain with his investigation, finding a note in the German military archives which stated that on the day in question several French soldiers had been buried in this sector, including a Lieutenant. Other documents suggested that Fournier and his men attacked a German field ambulance. An account of a German witness was also discovered, confirming the attack on an ambulance. During this attack, eight medical orderlies were killed and fifteen more soldiers were wounded.\footnote{Denizot and Louis 2000, 39; Adam 2006, 23–24 and 109; Saunders 2007, 101; Desfossés \textit{et al.} 2008, 29.}
A request for an authorised excavation was submitted in 1990. Remarkably, the first application was denied by the French Government, but in spring 1991 the presumed location of a mass grave was found with a magnetometer. At the same spot, a piece of red clothing and the remains of a French army boot had already been discovered during field surveys by volunteers. The second request for an excavation was approved six months later. For long (French) archaeologists shared the opinion that features and artefacts of WWI were not to be prioritised during an excavation. Nevertheless, public interest for this specific search increased, which eventually also led to growing political interest. The excavation was conducted by the local archaeological department. During the works, the site was guarded by the army and the police, and after six days of digging, the remains of twenty-one French soldiers were discovered. Eventually nineteen persons were positively identified, one of whom turned out to be Alain-Fournier.

The human remains were thoroughly investigated for trauma by forensic archaeologists. Obviously, they were examined for impacts of bullets and shrapnel. On the individual remains, a total of 51 impacts were counted by at least 35 different projectiles. It was also possible to reconstruct the distance, the angle and direction of the projectiles, ruling out the myth that these soldiers were executed by the Germans once and for all. The archaeological study also revealed unexpected insight into the social and economic backgrounds of the different classes in French society at the beginning of the 20th century. During the forensic investigation, the remains were measured as usual, finding that common soldiers had an average length of 1.60 meters. The lower ranks were mainly recruited amongst farmers and labourers. In contrast,
the average length of the officers was 1.78 meters. Especially during the first months of the war, the officers were recruited from the upper classes. As a result of a better diet and an easier life, they were taller, on average, than the working class soldiers.\footnote{Adam 2006, 38-39 and 114-115; Saunders 2007, 102-103 and 161.}

The soldiers had been buried properly and with honour by the Germans. The mass grave itself was originally 5.2 by 2.6 metres, and though a mound had initially been erected on top of the grave, it had eroded over the years. The site was compared with both familiar and less familiar mass graves in Europe, including the prehistoric mass burial of Talheim, Germany, medieval communal graves of plague victims and military graves of the Franco-Prussian War (1870-1871), WWI and WWII. The artefacts found within the grave were divided into three categories: (1) weapons and ammunition, (2) clothing and headgear and (3) personal belongings. Different types of army buttons were found from two manufacturers: Alphonse Helbronner and Équipement Militaires. The soldiers’ rifles and bayonets, as well as the officers’ binoculars, revolvers and sabres were missing; perhaps they were taken as souvenirs by the German soldiers who buried them. The former site of the mass grave (Fig. 4.9) did become a new place of remembrance itself.\footnote{Saunders 2002, 103; Pollard and Banks 2007, v; Pollard 2008, 200.}

This excavation can be regarded as the very birth of conflict archaeology in France. Previously, during the construction of the TGV railway (1987-1989), archaeologists also discovered features of WWI from time to time, but they were not considered of any value.\footnote{Adam 2006, 102 and 104; Saunders 2007, 103–104; Desfossés et al. 2008, 29.} In the following years, however, French archaeologists started to recover more and more features and artefacts from this particular era. During the 1990s, a project was started to investigate the proposed route of the A29 highway from Amiens to

Fig. 4.10. German mass grave as discovered by archaeologists near the village of Gavrelle, France (Fouilles/Alain Jacques: Service archéologique d’Arras).
Saint Quentin. This survey was carried out by the *Institut National de Recherches Archeologiques Préventives* (INRAP). Near the village of Gavrelle, a crater containing the remains of twelve German soldiers was discovered in 1994 (Fig. 4.10). The crater was thoroughly investigated, and it was established that the soldiers belonged to the 6th and 7th companies of the 152nd Infantry Regiment. They had been killed during the 1918 Spring Offensive, which started in this sector on 28 March. Unfortunately, it was not possible to identify any of the casualties, since the personnel records had been destroyed in 1945. Since the discovery of the remains of Fournier, archaeologists have started actively taking features and artefacts of WWI into account.95 Like in Flanders, archaeologists run the risk of having to survey sites that may contain live ammunition. In France, bomb disposal squads now recover 500 tonnes of live ammunition every year. In addition, INRAP archaeologists are now taking courses to recognise the different types of ammunition and, more importantly, to be able to judge whether it is responsible or too dangerous to carry on with the excavation.96

For long, the suffering and death on the former western front was considered too painful to discuss. How did soldiers cope with the deaths and violence they witnessed almost on a daily basis? In 2001, French archaeologists by chance discovered the mass grave of twenty British soldiers near Monchy-le-Preux, south-east of Arras. The remains were revealed during an excavation at a Romano-Celtic settlement and ritual complex prior to the construction of a BMW warehouse. These soldiers belonged to the 10th Battalion of the Linconshire Regiment and were all killed during the Battle of Arras in 1917. It was first thought that these soldiers were buried with their arms linked together to underline their comradeship in life and death. However, the truth was less poetic. Forensic research showed that their arms had been put across their laps, but decay and the pressure of the earth forced the limbs to move, giving the bodies the semblance of being interlinked. This mass grave contained much information about the circumstances of the soldiers’ deaths. At least 69 impacts were counted on the twenty individuals. Two soldiers were incomplete but had been buried in anatomical order by their comrades. It was not possible to positively identify any of these soldiers. However, DNA profiles showed that three individuals were, in fact, related.97

Of all the countries in the world, only the USA is actively searching for its missing soldiers through the proactive activities of the Joint POW/MIA Account Command.98 Each year, the US government spends approximately $100,000,000 to find and identify their missing soldiers.100 Still, professional archaeology insists on a painstaking forensic approach to the recovery of battlefield casualties, aimed at maximising research potential and, most importantly, the possibility of identifying the casualty to give official and personal closure to relatives.101 It is estimated that the remains of 200,000 missing soldiers are still hidden below the surface in the relatively small area of the former Ypres Salient in Flanders. Similarly, it is estimated that approximately 100,000 Commonwealth soldiers are yet to be discovered on the former battlefields at the Somme, France.102 Of course, the nature of modern warfare dictates that not all such remains will be articulated, but it is essential nonetheless that robust technical and ethical practice founded on respect for local laws and appropriate archaeological methods are in place and understood.103

Just like in Flanders, archaeological interest in modern conflict in France started with excavating the remains of WWI. Nowadays WWII is also taken into account and considered part of the national patrimony. With regard to WWII, the coastal region of Normandy is most interesting to French archaeologists. On 6 June 1944, the liberation of Western Europe started with Operation Overlord (6 June–30 August 1944),

---

95 Adam 2006, 80; Fraser and Brown 2007, 160; Saunders 2007, 100 and 104; Desfossés et al. 2008, 29 and 76.
96 Cf. Van der Schriek 2016, 5.
98 POW: Prisoner of War, MIA: Missing In Action.
100 Toebosch 2006, 29; Lynch and Cooksey 2007, 14.
101 Pollard 2008, 201.
102 De Meyer 2006a, 53; Saunders 2007, 98.
103 Van der Schriek and Van der Schriek 2014, 238.
when American, Canadian and British troops landed on these beaches. When the battle was over, the region was in ruins. As early as the 1960s, numerous amateurs, hobbyists and militaria collectors wandered across the former battlefields, damaging the archaeological archive. Eventually, this triggered professional archaeologists to act. The first step was to investigate the remains of the Atlantic Wall, an extensive system of fortifications constructed between 1942 and 1944 along the coast of Scandinavia to the Spanish border to protect the European continent against an Allied invasion. For long, these remains were neglected and handed over to natural erosion and spatial development. About 83% of the bunkers along the coast of Normandy are currently in danger due to strong erosion by the sea. Archaeological research incorporated mapping infantry positions, artillery positions and strongholds and recording both typological differences as well as German graffiti. Graffiti could be used to study several themes; they are a powerful connection between past and present, directly linked with a moment in time and with former residents.

Archaeological traces of Operation Overlord were discovered at several sites across Normandy too, such as craters, human remains, former (provisional) burial sites, and (temporary) prisoner-of-war camps. Excavations were complemented with aerial reconnaissance photos, historical documents and military archives. In 2013, a small-scale excavation was carried out at Saint-Germain-de-Varreville, Manche. Traces of a previously unknown bivouac of American parachute troops were discovered at this particular site.

Various foxholes of both Allied and German troops were encountered and recorded as well. Logistical traces, such as a repair site for cars, remains of temporary Bailey bridges and Allied airfields were included in several surveys across Normandy. In 2010, the remains of a temporary airfield at Bretteville-l’Orgueilleuse near Caen were excavated, marking the first time that such an airfield was recorded archaeologically. These investigations allowed for much improved insight into the logistics and development of the liberation of France and Western Europe.

Another important aspect of archeological research in the Normandy district is the discovery of human remains, both of soldiers and civilians, killed during WWII. Approximately 37,000 Allied soldiers and over 50,000 German soldiers were killed during the battles in Normandy. The bodies were concentrated at several official military cemeteries after the war, classified by nation. Various provisional cemeteries were excavated, for instance at Cagny, east of Caen, in 2013. Remains of camouflage ponchos indicated that soldiers of the Waffen-SS were once buried here. No human remains were discovered; the former cemetery was cleaned properly.

4.4 Germany

In Germany, the more recent past is becoming increasingly important to archaeologists. The country has a rich archaeological archive on modern conflict, but all sixteen individual federal states have their own archaeological laws and legislations. Interest in WWII started later than elsewhere in Europe and WWII is still considered a heavy burden on today’s society. In East-Germany (1949-1990) it was not allowed, under any circumstances, to remember any aspect of WWII in a collective way, except for the resistance against National Socialism, as explained in chapter 3. At the same time, in West-Germany remembrance of WWII was often linked with Stalinist repression in Eastern Europe. The remembrance of WWII was,
and is, very selective.\textsuperscript{111} German conflict archaeologists therefore generally focus on older times; most famously on the site of the Battle of Varus (AD 9) at Kalkriese.\textsuperscript{112}

Another popular era for conflict archaeological research is the Thirty Years’ War (1618–1648). In 2007, a mass grave was discovered by chance at Wittstock. The grave contained the remains of 125 soldiers: 88 individuals were documented \textit{in situ}, as well as several disarticulated bones belonging to at least 37 other persons (Fig. 4.11). Research determined that they had all died during the Battle of Wittstock (4 October 1636). These soldiers were buried wearing only their undergarments and no weapons were found on them. The mass grave was probably made by the victorious Swedes and measured six metres in length, 3.50 metres in width and approximately 1.70 metres in depth. Forensic archaeology revealed a wealth of data on the health of each individual as well as on their cause of death. From 2009 to 2011, the archaeological investigation was expanded with a metal detecting survey. The goal was to find the scope of the battlefield and retrieve more information, such as how the battle progressed, which weapons were used and post-battle processes such as looting. Over 1,100 artefacts were recovered that could be linked to the battle of 1636.\textsuperscript{113}

Researching post-medieval sites by means of modern methods is quite new for German archaeologists. Such work has been carried out at two battlefields in Schleswig-Holstein and one in Brandenburg. However, many historic battlefields have been partially or even entirely destroyed by building developments, natural erosion or illegal metal detecting.\textsuperscript{114} The battles of Lauenburg (17–19 August 1813) and

\begin{thebibliography}{99}
\bibitem{endlich2007}
Endlich 2007, 15 and 25; Sturdy Colls 2012, 81.
\bibitem{rass2011}
\bibitem{eickhoff2012}
\bibitem{homann2009}
Homann and Weise 2009, 27; cf. Van der Schrick and Van der Schriek 2014, 229.
\end{thebibliography}
Großbeeren (23 August 1813) were part of the Napoleonic Wars during the Sixth Coalition (1812-1814). After Napoleon’s defeat in Russia, several states in Europe revolted and fought against the French troops. The most famous Napoleonic battles on German territory were those at Dresden, Kulm, Katzbach and Leipzig, but battles also took place in the northern parts of the country.\textsuperscript{115}

In 2007 and 2008, three metal detecting surveys were carried out on parts of the battlefield of Lauenburg (Schleswig-Holstein). Although the French forces were victorious, the Coalition troops halted their progress for two days, so other troops could focus against a different French Army at Großbeeren. Over 100 lead balls for both muskets and rifles were recovered. Since it was possible to link the material to the opposing forces, archaeologists were able to challenge the historical accounts of the battle and its aftermath. The historical sources on the battle contradicted each other on several levels, and only a few of the French units were indeed identified. The exact positions of the opposing forces were also unclear, as well as the extent of the main combat area. The landscape had not changed much since the battle, but had been disturbed on several occasions. Some parts of the battlefield are presently in use as agricultural land and on 29 April 1945, British forces shelled the city and its surroundings for five hours. Furthermore, illegal metal detecting took place all over the area.\textsuperscript{116}

French infantry used smoothbore muskets. In 1792, the weight of these musket balls was defined as 24.45 grams. The German troops at Lauenburg used rifles with a grooved barrel, which made them more accurate than muskets. These so-called proof-balls have a distinctive form. A Danish Battalion on the side of the French was also equipped with rifles, but their lead ammunition was much larger than the type used by the Germans. Therefore, all lead balls could be linked to one of the three opposing forces at Lauenburg. The distribution of the recovered fired and unfired ammunition showed were the most intense fighting took place.\textsuperscript{117}

The village of Großbeeren (Brandenburg) is located to the south of Berlin. On 23 August 1813, Napoleon’s army tried to seize the Prussian capital but was defeated by Coalition troops. In 2006, a metal detecting survey was conducted at the central area of the battlefield, prior to the construction of three tennis courts. In 2005, parts of the battlefield were given monumental status to protect them. Researchers only expected to find a few lead musket or rifle balls, since the heavy rain on the day of the battle made the use of firearms quite difficult. Due to its location, the battlefield was also easily accessible for civilians, who searched the site intensively when the fighting was over.\textsuperscript{118}

Nonetheless, over 100 artefacts were recovered, 31 of which could be linked directly to the battle. No distinct concentration of findings could be pointed out, however. The findings included ten musket balls, parts of artillery shells, buttons and a military chinstrap of a shako. According to the historical sources, the French troops did retreat hastily from their position near a windmill, but the archeological evidence suggests that they did retreated in an orderly fashion. Due to the rain they could not use their firearms, but the Prussian troops were halted by canister shots by the French artillery.\textsuperscript{119}

Idstedt (Schleswig-Holstein) was a battlefield during the First Schleswig War (1848-1851). In 1848, Germany did not exist as a single state, but was instead known as the German Confederation, consisting of several small German states, each with their own ruler. Like Germany, Denmark was not a single, cohesive country. In addition to the Kingdom of Denmark itself, the rule of King Frederik VII in 1848 reached further to the south and also included the Duchies of Schleswig, Holstein, and Lauenburg, dividing the Kingdom in two ethnic groups: Danes and Germans. As elsewhere in Europe, the First Schleswig War was full of emerging nationalist sentiment. The causes of this conflict were rooted in the debate between the Danish and German-speaking populations about the status of the Duchies of Schleswig
and Holstein. The King of Denmark was ruler of the Kingdom of Denmark and of the Duchies, but the German-speaking population had fewer rights than the Danish-speaking population.\footnote{Nielsen 1993, 2; Homann and Weise 2009, 45–46; cf. Van der Schriek and Van der Schriek 2011, 150.}

Between 24 and 25 July 1850 a large battle took place at Idstedt, involving about 62,000 soldiers. The battleground stretched over 18 kilometers from east to west, covering many small woods, streams, lakes and bogs, and though this gave the troops of Schleswig-Holstein a favourable defence line, they still lost the battle, which would ultimately decide the outcome of the war. Denmark gained complete control over the three Duchies. Since the 1990s, the former battlefield has been repeatedly surveyed archaeologically with metal detectors, resulting in over 3,000 finds from the battle, despite building developments and illegal metal detecting.\footnote{Homann and Weise 2009, 45–47.}

The exact locations of the various units involved in the battle and the spots that saw the heaviest fighting could not be distilled from the historical sources alone. The objects discovered between 2004 and 2006 were also recorded by using a GPS receiver, comparable to the survey conducted at Towton, United Kingdom. Many projectiles for different types of firearms were unearthed, as well as several lengths of cannon fuse, which indicated artillery positions. The distribution of the artefacts showed several high concentrations of battle relics, suggesting an intense and long-lasting battle in the surveyed area. Worth mentioning was the discovery of several so-called Siemens fuses, developed in 1847 by the later well-known industrialist Werner von Siemens (1816–1892). Until August 1849, the Army of Schleswig-
Holstein received help, including troops, from the German Confederation. However, this discovery indicates that Schleswig-Holstein still received supplies in 1850.\footnote{Homann and Weise 2009, 51 and 53-54.}

Although German archaeologist do study older eras, their focus is increasingly shifting to conflict sites of both World Wars since the 1990s, though they are also considered painful legacies of the 20th century.\footnote{Theune 2014, 6.} One can think of concrete fortifications like the Westwall (Fig. 4.12), an example of static warfare, but the remains of more mobile warfare, such as (rapidly built) foxholes and artillery positions, are also present in the landscape.\footnote{Whiting 1995, 249-250; Scott and McFeaters 2011, 118-119; Van der Schriek and Van der Schriek 2013b, 20-21.} Historical testimonies, combined with the geography of a site and archaeological evidence, paint a much better picture of the course of a battle.\footnote{Rass and Lohmeier 2011, 183 and 185.}

In September 1944, the Allied Armies had reached the borders of Germany. After capturing the city of Aachen, the Allies launched Operation Market Garden (17–25 September 1944) which ended in an unexpected defeat. South of Aachen, American troops entered the Hürtgenwald (Hürtgen Forest). Scholars estimate that 20,000 to 30,000 soldiers on both sides died during the following bloody battles in the dense forest on the Belgian-German border. The Battle of Hürtgen Forest (19 September 1944–10 February 1945) was, in fact, a series of four clashes that lasted only a couple of days or weeks each, but covered a period of nearly five months when taken together. The boundaries of the battlefield are not clear at all. Weather conditions were very poor, and the forest has numerous valleys and steep ravines, making it a less than ideal battleground to attack. However, for conflict archaeologists, these conditions produce an artefact-rich site: there was ground combat for an extended period of time, there were no immediate recovery operations and the area was rather inaccessible for visitors in the post-war era.\footnote{Rass and Lohmeier 2011, 189 and 195.}

After the battle, dead bodies, weapons, tanks, live ammunition and landmines littered the Hürtgenwald. The fighting, however, was quickly forgotten, as the Allies did not want to remember a lost battle in a victorious war and the German public was overwhelmed by other aspects of the war, such as the Holocaust or the occupation of its territory by the Allied Armies. For long, archaeological research of the battlefield was considered unnecessary. Unfortunately, many amateurs have searched and disturbed the site since.\footnote{Rass and Lohmeier 2011, 186.}

However, the ongoing demolition of the bunkers of the Westwall alarmed archaeologists in the Rhineland who started to develop an interest in WWII. A debate was started about their historical significance: should these defence works be protected and some individual bunkers be preserved, or should the entire Westwall even be regarded as a monument? In 2007, some bunkers in the Hürtgenwald were surveyed archaeologically. At first, only the structure itself was studied. Soon, archaeologists also started looking at the surrounding area and learned that foxholes, trenches and battle-related artefacts could add new storylines to the historical narratives or even recover information that never made it into the written sources. In the same year, a small-scale follow-up excavation was conducted at two former positions of American infantry battalions, where some of the fiercest fighting had taken place. This survey provided new knowledge on how exactly such positions were constructed and used in battle. This kind of research will provide a better understanding of a conflict site on a micro level.\footnote{Rass and Lohmeier 2011, 189 and 195.}

As early as the 1930s, the Hürtgenwald was selected as a potential battlefield with the construction of the Westwall.\footnote{Rass and Lohmeier 2011, 195-196; cf. Passmore et al. 2014, 1280; cf. Roymans and Fernández-Götz 2018, 8.} This defence line, known as the Siegfried Line by the Allies, was constructed from 1936 as a response to the French Maginot Line. In contrast to the French, the Germans did not construct a wide, interconnected defence line, but instead preferred a range of smaller pillboxes in depth, up to four kilometres deep. Apart from its strategic impact, this project also had a psychological effect on the enemy, as demonstrated in September 1939. Only 200,000 German soldiers were stationed along the entirety of

\begin{itemize}
\item Homann and Weise 2009, 51 and 53-54.
\item Theune 2014, 6.
\item Whiting 1995, 249-250; Scott and McFeaters 2011, 118-119; Van der Schriek and Van der Schriek 2013b, 20-21.
\item Fox 1993, 326-327; Rass and Lohmeier 2011, 179; Scott and McFeaters 2011, 116.
\end{itemize}
the Westwall (approximately 630 km), while most of the troops were fighting in Poland. On the other side, the Maginot Line (over 700 km) was held by approximately 800,000 French troops.130

Remarkably, German archaeologists researched and protected the remains of the Westwall at quite an early stage at some parts of the former defence line. Immediately after WWII, many bunkers were demolished.131 As of 1957, the Westwall became State Property, but the dismantling of the bunkers still continued. In 1978, the federal state of Nordrhein-Westfalen declared parts of the Westwall a monument, with other federal states following quickly. In 1980 new regulations on monuments were implemented, which also protected more recent structures132 and stated that the remaining bunkers had to be preserved and that the endangered structures had to be documented.133 In 2004, an archaeological investigation started at a bunker near the village of Pachten, running for four years before ending with the restauration of the defence work. *Westwallanlage Dillingen* is now open for the public as a museum. The bunker was also classified as a monument and is as such protected since 2006.134

Archaeological research of the remains of WWII is often a delicate issue due to the strong affiliations with the Third Reich (1933–1945), especially on contested landscapes like former concentration camps.135 Although these camps are not fields of conflict in the traditional sense, they are an integral part of broader conflict.136 The question always remains whether it is ethical to excavate at sites of genocide and mass violence. However, it should be kept in mind that contested heritage is also part of a country’s cultural history and should get the same attention as any other heritage.137

In 2004, German archaeologist Matthias Antkowiak led an excavation at the satellite camp of Rathenow near Sachsenhausen. At first, the local community was sceptical about the value of an archaeological investigation of the site, including the federal state government of Brandenburg. The majority of the local community believed, or wanted to believe, that there had never been a concentration camp at this location, in a plain attempt to avoid acknowledging its existence, as admitting it would resurrect painful issues. However, there were strong indications, such as aerial photographs and eyewitness reports that a camp had actually existed at Rathenow during WWII.138 Across the border, at Mauthausen in Austria, an excavation was conducted in 2009 by German archaeologists, wondering what sort of finds they could actually expect at the sites of former concentration camps. The main concentration camp is now an open-air museum. Archaeological research was carried out at the lesser-known, secondary camp outside the walls of the main concentration camp.139

The excavation at Rathenow was carried out according to ‘traditional’ methods. In the waste facilities, several personal belongings were found, such as combs, pipes, cutlery and aluminium cans. A name was found engraved on one can, Van Loon, together with his prisoner number, 100980. In the federal state of Brandenburg alone at least 100 of such satellite camps existed during WWII. However, most of these sites have been forgotten and difficult to localise. Archaeological research can have a large impact on the public, especially if it reveals a past that people would rather forget. Such projects and the generated material are therefore often used for ‘political education.’140 The excavation ruled out any other interpretation; a concentration camp had existed near the village. Archaeological research can play an important role in finding and documenting such camps and thus presenting ‘unwanted’ history.141

WWI also left several archaeological traces in Germany. Numerous prisoner-of-war (POW) camps were scattered across the country during the years 1914–1918, for instance. In today’s Germany, we...
know of at least 175 POW camps, where over 2.5 million Allied soldiers were imprisoned. Despite the contrast between WWI POW camps, where soldiers were treated humanely, and WWII concentration camps with their inhumane regime, they are hardly subjected to archaeological research, even though this has the potential to reveal new information of such sites. At the previously discussed concentration camp of Castuaera, Spain, for instance, the prisoners were hardly fed, with the excavation revealing that the prisoners had virtually no access to meat. Small-scale excavations at such sites were carried out in Germany as well, namely at Gladbeck and Wittenberg. However, results were never published, a common problem for the investigated era and theme.

One exception is the excavation of the POW camp of Quedlinburg in the federal state of Sachsen-Anhalt, which was in use between September 1914 and the end of the war. Between 2003 and 2005, several excavations were carried out along the planned route of a new motorway. Over 30,000 structures were recorded, dating from the Neolithic up to the modern age. After some discussion, the decision was made to investigate the former POW camp of Quedlinburg with the same archaeological methodology as any prehistoric feature. Approximately 5% to 10% of the camp was archaeologically investigated, and 90% was left in situ as undisturbed cultural heritage.

POW camps were essential for the captured soldiers, as they provided shelter and food. The prisoners were also used as labourers in the region where they were held, because most German adults were away fighting at the front. Little was known about this particular site when the excavations began at Quedlinburg. Apart from the local monument, only some photographs and even fewer historical sources were known (Fig. 4.13). Archaeology could supplement the historical sources and ended up being of

Fig. 4.13. The prisoner-of-war (POW) camp at Quedlinburg, 1914–1918 (Landesamt für Denkmalpflege und Archäologie Sachsen-Anhalt, 1. Schlossmuseum Quedlinburg; 2-3 K. Ulrich).
major importance for a better understanding of the site. The entire layout of the camp, along with its drainage system, barracks and several barbed fences, was reconstructed (Fig. 4.14). The wooden barracks, 48 in total, were heated with iron stoves, measured 50 metres in length and were approximately 15 to 20 metres wide.146

In 1917, around 3,400 prisoners lived in the camp. After the German Spring Offensive (21 March–18 July 1918) on the western front, the number increased rapidly to almost 18,000. The daily life of the (mainly) British, French and Russian prisoners and their German sentries was made visible by means of personal objects, information which is hardly found in historical sources. Remains of clothing, pipes, dice and military buttons were unearthed, which probably belonged to prisoners who died of illnesses. Approximately 700 prisoners of war died at the camp, all of whom received a proper burial with full military honours at the central (civilian) graveyard of Quedlinburg.147

Prisoners could cook for themselves, but a canteen was also present at the POW camp. Although conditions were not ideal, convicts were treated humanely. Most of them died in the later years of the

---

war, because more and more soldiers were imprisoned in the same area, making them vulnerable to all sorts of diseases. Furthermore, various types of food waste were found at the POW camp of Quedlinburg, such as pieces of pig- and cattle bones, probably used for stews, several brands of beer bottles (mainly German but also Danish) and all kinds of fish bones (Fig. 4.15). According to the historical sources, the prisoners would mainly eat dried cod and this type of fish was indeed encountered. The food scarcity of 1918 was also clearly visible in the archaeological record of the site, as few beer bottles were found for this year and the archaeological evidence shows that unusual fish, like rays, were eaten during this period. 148

The combination of contemporary sources and archaeological artefacts resulted in new perspectives on the lives of the imprisoned soldiers at Quedlinburg. This study proved how useful an archaeological excavation could be for shining a light on more recent eras. Based upon the investigation, a detailed plan of the camp was drawn, which provided new knowledge and ultimately led to the reconstruction of the internal structure of this particular POW camp. 149

4.5 Poland

After two World Wars, military history was viewed with great suspicion in many countries. In Poland, however, archaeological fieldwork on battlefields started as early as the 1960s. Until the 1980s, the former battlefield of the Battle of Grunwald (15 July 1410), also known as the First Battle of Tannenberg or the Battle of Žalgiris, was thoroughly investigated. The battle took place during the so-called Polish-Lithuanian-Teutonic War (1409–1411). However, the investigation was conducted by the Polish Army and consisted mainly of metal detecting surveys. Each country that had fought in the battle had its own narrative on the event, and a more scholarly assessment was implemented only recently. Since 2006, systematic archaeological research has become more common in East-Central Europe as well. 150

On 12 August 1759, a battle took place at Kunersdorf (present-day Kunowice) near Frankfurt an der Oder. It was one of the bloodiest battles of the Seven Years’War (1754–1763) 151 and was also Frederick the Great’s (1712–1786) heaviest defeat. His Prussian Army was crushed by a combined Russian-Austrian Army at Kunersdorf. The Prussian Army attacked the heavily fortified Russian-Austrian camp and the battle became a turning point of the war. The location for the camp was chosen for its natural defence features. 152

---

149 Demuth 2009, 179.
151 The main conflict occurred from 1756 to 1763, hence the name.
The Prussian infantry attack was preceded by heavy shelling of the Russian-Austrian positions. The Prussians took the first line of defence and pushed forward to the main centre of the camp, but instead of securing victory and holding the ground he had gained, Frederick ordered to continue the assault. Initially successful, the Prussian troops were delayed by a natural obstacle, a ravine in front of the last line of defence of the Russian-Austrian Army. Slowly, they were pushed back and disorganised. When the cavalry units collapsed, the infantry broke and ran, while the artillery was abandoned.153

The Russian fortifications are still preserved and were studied by archaeologists in 2007. According to the available historical sources, major events took place within these fortifications. North of the campsite, in a meadow, human remains were discovered during the archaeological fieldwork. The bones were not very well preserved, hindering a thorough anthropological analysis. However, it was determined that this individual was between 40 and 50 years of age and about 1.65 meters tall. Other artefacts, including buttons, an emblem with the initials ‘EIP’154, lead bullets and the remains of his leather cap revealed that the individual was a Russian soldier, linked to the battle of 1759. In April 1945, heavy fighting took place between German and Russian troops once more, but the discovered artefacts ruled out a WWII victim.155

Due to the distribution pattern, the unearthed artefacts are a strong indication that the body was looted after the battle. No distinctive grave could be found and while his remains were just below the surface, this soldier was most likely never buried and simply left on the battlefield. According to historical accounts, it was customary to bury soldiers naked in mass graves, a task usually performed by local peasants and army servants.156

In the investigated area, 110 lead musket balls were recovered, and numerous signs of heavy fighting were encountered around the human remains of the Russian soldier specifically. In total, 67 of the musket balls could be linked to the Prussian Army and 28 to Russian units. The overrepresentation of Prussian musket balls is explained by the fact that they were the attacking force at this spot, and Prussian soldiers would also carry more ammunition than Russians. Near the remains, uniform insignia were found, clearly not related to the individual and identified as Prussian grenadier insignia. According to the historical sources, the Prussians attacked in a very narrow line, but the discoveries are evidence for a much wider line of attack than suggested by these sources.157

Although archaeologists investigate older conflict sites like Kunersdorf in Poland, archaeological research is without doubt mainly focused on the former German extermination camps of WWII. When researching such heavily contested sites, archaeologists face a series of tensions between past and present and between remembering and forgetting.158 The extermination camps were the outcome of the so-called Final Solution, the policy of deliberately and systematically murdering the Jewish population of Europe, formulated during the Wannsee Conference (20 January 1942). Over 20,000 labour camps, concentration camps and extermination camps were constructed all over German-occupied Europe.159 The different types of camps also provide a very diverse archaeological dataset.160

Only recently have the surviving archaeological remains been taken into account in the historical debate. Many archaeological remnants are still ill-defined, unrecorded or not even precisely located. Detailed archeological surveys could provide new information about those sites.161 Several extermination camps have been investigated by archaeologists in recent years, including Chelmno, Belżec, Sobibór and

153 Podruczny and Wrzosek 2014, 36.
154 EIP: Elżbieta Imperatrica Pierwaia, Elisabeth the First Empress.
155 Podruczny and Wrzosek 2014, 36–37 and 42.
156 Podruczny and Wrzosek 2014, 38 and 42.
159 Sturdy Colls 2012, 90; 2013, 51; Carpenter and Marcigny 2014, 24; Theune 2014, 53–54.
160 Schute 2013a, 15.
Treblinka. Although they were in use for only a relatively short time span, these camps facilitated the need for mass extermination centres and hundreds of thousands of people were murdered at these locations. Both Belżec and Sobibór were in use from March until December 1942. At Belżec, over 400,000 people were killed, at Sobibór between 150,000 and 200,000 were murdered, and at Treblinka, over 750,000 people were killed on an industrial scale.\textsuperscript{162}

The camps were disbanded and destroyed by the Germans themselves, along with all available photographs and incriminating documents. Farms were constructed at the sites and the land was used for agriculture afterwards. Since practically all eyewitnesses were murdered and there are very few historical documents on this topic, we actually know very little about the extermination camps. No layout is available for Belżec, for example. There are several important research questions that only archaeology can answer: Where are the mass-graves? Where were the gas chambers?\textsuperscript{163}

At Auschwitz-Birkenau, the most ‘famous’ German concentration camp, a museum and memorial were erected as early as 1947. After the collapse of the Soviet-Union, other former camps desired their own monument as well. Prior to spatial development, an archaeological excavation was carried out at Belżec between 1997 and 1999, determining which structures were still present just beneath the surface. In addition to the structures, 33 mass graves were localised as well. In the lower parts, human remains were discovered, whereas cremation remains were found in the upper layers. There was, however, no crematorium at this extermination camp. As such, the archaeological investigation provided new information: the bodies were not immediately cremated, as had always been assumed, but first buried and later

\textsuperscript{162} Sturdy Collins 2012, 73 and 90; Theune 2014, 55.
\textsuperscript{163} Cf. Myers 2008, 235; Sturdy Collins 2012, 70 and 91; 2013, 51; Theune 2014, 55.
burned. After an explicit request from the Jewish community, the graves were not disturbed any further, as Jewish Halacha Law prohibits the disturbance of human remains for whatever reason.\textsuperscript{164}

Archaeologists also mapped the camp structures of both Chelmno and Sobibó". Archaeologists also mapped the camp structures of both Chelmno and Sobibó. Chelmno was the first extermination camp to be constructed and at the very minimum 152,000 people were murdered in this camp. Excavations at this site started as early as 1986, and other excavations were carried out during the years 1997 to 2002 and once again in 2003 and 2004. One of the most striking finds was a set of dentures with a Hebrew inscription.\textsuperscript{165} Between 2000 and 2001, another archaeological excavation was carried out at Sobibó, before the construction of a new monument (Fig. 4.16). Research determined that the structures that had been assumed to be the gas chambers were definitely not the location where prisoners had been gassed. The study demonstrated some inconsistencies between the historical sources and the encountered remains. Around 1,000 artefacts were unearthed during the excavations, most of which have been incorporated into new exhibitions or educational databases.\textsuperscript{166} According to Polish law, every archaeological find on its territory becomes property of the Polish state and not of any next of kin.\textsuperscript{167}

In 2007, another excavation campaign was held at Sobibó by an Israeli team. Redevelopment plans in the area could damage potential archaeological remains, and the site therefore had to be mapped. Many unearthed artefacts could be linked to Dutch captives, transported to this extermination camp from Westerbork in the Netherlands. During the campaign of 2013, only a limited number of artefacts were uncovered. The researchers focused on an area near the main monument, just outside previously located mass graves. In addition to facilitating ‘political education,’ the study of the material culture of the extermination camps can also give new insights into the spatial planning of such sites and expose the living conditions of both prisoners and guards.\textsuperscript{168} Above all, though, such artefacts have a highly emotional value that goes beyond their academic value.\textsuperscript{169}

When dealing with such remains, numerous political, social, ethical and religious questions arise. Polish national heritage bodies, for instance, approved that hair of the victims of the extermination camps could be displayed in museums, but the Jewish community wanted these remains to be treated in accordance with Halachic traditions. This raises an important question: should the Jewish victims all be considered to have been 	extit{practising} Jews, who would have wanted to be remembered according to Halacha Law? Archaeologists should not question these traditions and beliefs, but it clearly does raise important questions with regard to ethics and (the possibilities of) archaeological research. The pioneering work of British Holocaust archaeologist Caroline Sturdy Colls developed a non-invasive archaeological methodology for investigating German extermination camps in present-day Poland properly, whilst taking the variety of issues into account. Research has been conducted at Treblinka since 2009.\textsuperscript{170}

An interdisciplinary approach was used to evaluate the site at Treblinka. A labour camp (Treblinka I) was constructed in 1941, initially for Polish political prisoners. Later, this was followed up by the deportation of Jews. At the extermination camp Treblinka II, over 800,000 people were massacred in just one-and-a-half years, mainly European Jews and an undetermined number of Poles and Roma (gypsies). Demolished by the Germans after a prison revolt in August 1943, hardly anything is left of this former extermination camp (in contrast to the labour camp, Treblinka I). Few witnesses survived; historical accounts relied on the limited documents available. The site is located in a very desolate area and little was known about the camp’s size and the layout. However, the first memorial was erected at the site as

\textsuperscript{164} Gilead et al. 2009; Sturdy Colls 2012, 73 and 88; Theune 2014, 55.
\textsuperscript{165} Gilead et al. 2009; Theune 2014, 55.
\textsuperscript{166} Gilead et al. 2009; Sturdy Colls 2013, 53 and 73; 2015, 39.
\textsuperscript{167} Schute 2013a, 5 and 13–15.
\textsuperscript{168} Schute 2013a, 12 and 15; 2013b, 8; Banks 2014, 173; Sagona and Birkett-Rees 2016, 83.
\textsuperscript{170} Sturdy Colls 2012, 70, 86 and 88–89; 2013, 51; 2015, 38 and 41.
early as the 1960s. The archaeological project focused on determining the size of the extermination camp (Treblinka II), what physical remains were left and where mass graves were located.\footnote{Myers 2008, 235; Sturdy Colls 2012, 89–92; 2013, 52; \textit{ibid.} 2015, 39–42; Theune 2014, 55.}

The archaeological survey already pointed out that the memorial demarcated the campsite incorrectly: Treblinka was much bigger than shown on the ground. Over 100 features were recorded, such as the foundations of specific buildings, including the gas chambers, pits, and earthworks. The memorial landscape was modified afterwards, and the archaeological fieldwork increased public knowledge of the site. Due to an overestimated reliance on historical sources, the existence of these features passed into oblivion. Because non-invasive techniques were used, the survey did not disturb any humans remains present at the site, thus complying with Halacha Law.\footnote{Sturdy Colls 2012, 92; 2013, 51–52; 2015, 39–41.}

\section{The Netherlands}

From the studies described in this chapter, we can conclude that conflict archaeologists do favour to excavate locations identified with famous battles (for instance Towton and Somme) or well-known persons (Alain-Fournier, Wilfred Owen).\footnote{Pollard and Banks 2007, vii; Carman 2013, 15–16, 18 and 21.} Several themes can be distinguished, namely the archaeology of battlefields, archaeology of camps, defence structures and aviation archaeology. In the Netherlands, the pattern has been more or less similar, with an identical national focus. But why did conflict-archaeological research start here later than in the other countries and regions discussed in this chapter? Although I will not provide a complete summary, some Dutch studies focusing on WWII published between 1984 and the present will be discussed here. The Dutch (national) excavation protocols and the resulting difficulties in excavating sites related to WWII, as well as in working with firearms and ammunition will be explained in the following chapter.

"Battlefield Archaeology still has to prove itself as a discipline" was the headline of a Dutch newspaper article in December 2000.\footnote{Toebosch and Kat 2000.} The added value of modern conflict archaeology is presently emphasised in the United Kingdom, Flanders, France, Germany and Poland. All countries consider WWI and WWII as part of their archaeological heritage, as manifested in their archaeological rules and regulations.\footnote{Dewilde and Wyffels 2014, 41–43; Bosman \textit{et al.} 2014, 112; Carpentier and Marcigny 2014, 9–10.} For long, the Netherlands was far behind when it came to this archaeological discipline. Dutch academic interest in the heritage of war, or in the skills and cultural-historical policies practiced by local and national government, has, at least until recently, been limited. This situation has led to large deficits in the field of academic research and in the conservation and management of military heritage, in both a methodological and theoretical sense. The general opinion was that conflict archaeology was a too expensive way of telling a history we already know, especially with regard to WWII. Most archaeological research conducted in the Netherlands was a result of the Valetta Convention (16 January 1992), which had the main goal of protecting archaeological heritage. As a result, the greater part of WWII-related excavations were not research-driven.\footnote{Van der Schriek and Van der Schriek 2014, 231; Bosman \textit{et al.} 2014, 15; Wijnen \textit{et al.} 2016, 22.} As will be discussed in the following chapter, (Dutch) archaeologists should get used to the idea of different research questions and other narratives. Although the story of a site might be known, archaeology can add new storylines. However, conflict sites of WWII are still not commonly treated as equals to their ancient counterparts in the Netherlands.\footnote{Cf. Sturdy Colls 2012, 74.}

With the passing of the last eyewitnesses of WWII, the events of the war are steadily entering the domain of history, and our understanding of this era will come to rely more and more on archaeology.
As explained in chapter 3, archaeology of the modern era has a great overlap with heritage practices. At present, the landscape is of greater physical importance and the scars of war within a landscape can already be a reason to visit a particular site or region. For instance, ruins created by war can make the experience of a landscape ‘pleasurable’ for later generations. There is a strong need to ‘experience’ the war. The exceptional memorialised landscapes of both WWI and WWII contain many sites for pilgrimage and remembrance, and these heritage sites are to be considered lieux de mémoire, as explained earlier. However, heritage represents war in a particular way, focusing on the history of the nation, a region or communities.

The archaeology of mass violence and conflict was for long an underexplored field of study in the Netherlands, despite public interest in WWII and archaeological involvement with the broader field of conflict archaeology. Archaeology provides a visible and comprehensible (part of a) history – in contrast to the words of historical documents. At present, more and more people are beginning to realise that it is important to investigate conflict sites of WWII by archaeological means. Obviously, the static battlefields of WWI did leave a different archaeological imprint than WWII in the Netherlands, which had a more mobile character. In 1940, only five days of actual fighting took place on Dutch soil, with another seven-and-a-half months of fighting occurring in 1944–1945.

Compared with the previously discussed countries, only a few research-focused excavations have been carried out to investigate and reconstruct the wartime activity at any particular conflict site in the Netherlands related to WWII. Before 2000, these finds were seldom recorded in official excavation reports and publications. Despite the paucity of conflict archaeological research, individual archaeologists participated in surveys out of personal interest or a particular personal commitment to the features and artefacts they came across during excavations. Their motives were largely personal, rather than stemming from the traditional spheres of development control or grant funded research.

Archaeological features and findings of WWII were usually chance finds and considered bycatch. As such, no explicit research questions were formulated with regard to this particular archaeological heritage, such as: How well are these features and findings preserved in the area? It is likely that a lot of important archaeological data on WWII is either unpublished or lies unread in un-synthesised case studies. Still, the archaeological record has demonstrated that well-preserved deposits related to WWII did survive in the landscape and below the surface. One of the earliest recorded excavations in which WWII was taken into account was undertaken in 1984. During an excavation at Colmschate (near Deventer), a German trench, some foxholes, pieces of glass and many bits of shrapnel were unearthed. In 1998, at Oosterhout, Gelderland, archaeologists discovered a special bycatch when they came across a British gun emplacement with dozens of shell cases placed tidily around the pit (Fig. 4.17). This gun position was most likely a remainder of Operation Market Garden (17–25 September 1944). At Zutphen, on the site of a former youth detention centre, archaeologists located a German trench and several mortar splinters. This trench must have been dug during the Battle of Arnhem, when Zutphen became a so-called Festung, a stronghold.
In some cases, the civilian side of war and conflict was highlighted too. During an excavation of Roman remains at the Hunerberg, near Nijmegen, several WWII features were discovered as well, in particular artefacts from the Allied liberation of the area in September 1944. Some houses were ruined during the fighting, and archaeologists discovered several cellars filled with rubble and broken furniture. One of the most remarkable finds was a little cash box filled with half-molten two-and-a-half guilder pieces, guilders and smaller coins, silent witnesses of the civilian suffering prior to liberation. In 1928, the managers of a synthetic silk factory near Nijmegen ordered the construction of a bunker to protect its workers in case of war. Due to the construction of a new bridge, this bunker had to be demolished, but archaeologists did investigate it before its destruction in 2010.

In 2000, a large-scale archaeological survey was carried out at Meerhoven (near Eindhoven). The objective of this investigation was to map the area’s archaeological potential, including WWII. During this excavation, features and finds dating to the Iron Age up to modern times were recorded. Between 1931 and 1932, an airfield was built at the nearby Zeelector Heide and Strijpse Heide, which was bombed during the German invasion in May 1940. Later, the airfield was also used by the Luftwaffe. The Allies bombed the site repeatedly during the following years of the war, mainly between 1944 and 1945. During the archaeological survey, many bomb craters were found, as well as the remains of two German anti-aircraft positions. Beer bottles, a German tube of suntan oil and rabbit offal were discovered at the site, providing insight into the daily life of the common German soldier.
In 2006, a commercial excavation company\(^{191}\) started to investigate an area at Habraken (again near Eindhoven) ahead of construction work. During WWII, the site had been part of Fliegerhorst Eindhoven, a German military airfield. Many craters and large amounts of unexploded ammunition were found. Because the researchers had expected to find large amounts of explosives, they had worked closely together with the Dutch Explosive Ordnance Disposal Squad (EOD).\(^{192}\) Ammunition was removed from the site before any archaeological investigation was allowed. In 2008, the remains of a machinegun and a rifle were discovered. The rifle turned out to be a remarkable find, as the barrel was still in exceptionally good condition and had been engraved with Arabic script. This rifle was not a standard German Mauser Karabiner 98 Kurz but a Turkish version dating from 1890. It is known from historical sources that members of the Luftwaffe who had to protect the airfield of Eindhoven were armed with both Turkish as well as Belgian Mausers.\(^{193}\)

One of the fiercest battles between Dutch and German troops in the early days of the war took place at the Grebbeberg, a natural, 52-metre high barrier west of Arnhem. Before WWII the Dutch Army constructed a trench system according to the French doctrine and experiences of WWI. There were outposts, a frontline, a stop line for counterattacks and a so-called backline. Artillery positions were set up at the rear. Small concrete bunkers, armed with machineguns, were interconnected with wood-covered trenches. The frontline was also obstructed with barbed wire. However, the position was not yet ready in May 1940. Not all the trenches were interconnected and there were only few radio lines between the frontline and the rear.\(^{194}\)

On 11 May 1940, German troops attacked the Dutch positions at the Grebbeberg from two sides: in the north the 227th Infantry Division of the Wehrmacht advanced together with the Leibstandarte SS Adolf Hitler, in the south the 207th Infantry Division and the SS-Standarte ‘Der Führer’ took part in the assault. All troops, with the exception of ‘Der Führer’, had taken part in the invasion of Poland in September 1939. Dutch soldiers had no experience at all and were also less well trained. However, Dutch troops did inflict heavy losses amongst the German forces in the early days of the war.\(^{195}\)

In the north, the Germans quickly broke through the Dutch defence works. Some Dutch soldiers tried to surrender and waved a white flag, whereas other troops nearby continued to fight. In anger, some German soldiers executed at least three Dutch prisoners of war and used many others as a living shield while advancing to the summit of the Grebbeberg. At the end of the first day, all Dutch outposts had been overrun.\(^{196}\) The following day, the remaining positions of the Dutch Army were heavily shelled, and in the afternoon, the SS attacked with approximately 1,500 soldiers (Fig. 4.18). Many Dutch troops retreated to the stop line. In the evening, a group of 300 Waffen-SS soldiers attacked the Dutch defences at the road from Wageningen to Rhenen. This raid was led by Obersturmbannführer Hilmar Wäckerle (*1899-†1941), a veteran of WWI and the former commander of the concentration camp at Dachau, Germany. On 13 May the Luftwaffe interfered and bombed the Dutch troops, resulting in a breakdown of morale. During the battle, 362 Dutch soldiers were killed, with another 20 missing in action. On the German side, 260 soldiers were killed.\(^{197}\)

In 2008 and 2009, ahead of the construction of a cycle track next to the road from Wageningen to Rhenen, a compulsory archaeological investigation was carried out. The province of Utrecht actually demanded that the archaeological features of the battle be included.\(^{198}\) During desk-based research, eight archaeological sites were mapped. The following excavations revealed the presence of WWII-related

\(^{191}\) Bouwhistorie, Archeologie, Architectuurhistorie en Cultuurhistorie (BAAC).

\(^{192}\) Explosieven Opruimingsdienst Defensie.

\(^{193}\) Van der Weerden 2008, 100-101; 2009, 100-103; Van der Weerden and Verspay 2015, 39; Wijnen et al. 2016, 25.


\(^{195}\) Bijkerk 2015, 109-110; Kamp and Hendriks 2010, 7.

\(^{196}\) Bijkerk 2015, 114.

\(^{197}\) The SS equivalent of a Lieutenant Colonel.

\(^{198}\) Bijkerk 2015, 113, 117-119, 127 and 134.

features at two sites, after which sections of a Dutch trench, part of the stop line, a German anti-tank canal as well as a German trench (the latter two dating from 1944 or 1945) were excavated. The German features were probably part of the so-called *Pantherstellung* and were only discovered on an aerial photograph after the excavation. In the last year of the war, German Supreme Command ordered the extension of the Westwall on Dutch territory, to which these features belonged. In 2009 and 2010, two other small-scale excavations were conducted at the Grebbeberg, which were not obligatory but were initiated and funded by a local volunteer group. Two Dutch bunkers with a cast steel cover were investigated by archaeologists for the first time ever in the Netherlands. The excavation could be regarded as a methodological test case. These bunkers were found to have been based on the French Pamard-type bunkers which were developed during WWI.

In the excavated part of the Dutch trench, remains of the wooded covering were found, though they were in poor condition. Amongst the discovered artefacts were a toothbrush, (Austrian) Mannlicher cartridges and a Hembrug/Steyr cleaning set for a Mannlicher rifle, the standard service rifle of the Dutch Army from 1895 onwards. Some German material was also recovered near the road. The most special find was a 7.63×25mm cartridge for a Mauser C96, a semi-automatic pistol produced from 1896 to 1937 but still highly popular amongst German officers at the outbreak of WWII. It was probably fired...
during the attack on the Dutch lines led by Obersturmbannführer Wäckerle. These excavations were followed by a large-scale metal detecting survey, again initiated by the province of Utrecht. Most findings were distributed alongside the road, the main route of the German attack in 1940. Hardly any tangible traces of the battle are left. After this survey, the battle was visualised in and alongside the cycle path.206

November 2010 marked the first time that an excavation was carried out at a former concentration camp in the Netherlands, near Amersfoort.207 The camp in question was a transit camp.208 In 1939, Dutch barracks were built at the spot for soldiers who were working on the defence line at the Grebbeberg, but it was turned into a German concentration camp in 1941. From an archaeological point of view, we know very little about the camp, although it was one of the largest in the Netherlands.209 Classified as a transit camp, forced labour was also practiced here. Between 1941 and 1945, over 37,000 persons were imprisoned at Amersfoort, approximately 20,000 of whom were deported to concentration camps in Germany. It is estimated that 650 people died at this camp, including over 100 Red Army soldiers who were imprisoned here.210

---

207 Schute and Wijnen 2010; Schute 2013b, 25; Schute and Van der Laan 2015, 38; Wijnen et al. 2016, 25.
208 Polizeiliches Durchgangslager Amersfoort.
209 In contrast, many historians have published about the camp, for instance Von Frijtag Drabbe Künzel (2003) and Van Vree and Van der Laarse (2009).
210 Schute and Wijnen 2010, 7–8, 13 and 58; Biezeveld 2011.
A four-day survey was carried out to redevelop the memorial site.\textsuperscript{211} Excavations focused on the trenches (Fig. 4.19) and the firing range outside the camp. The museum\textsuperscript{212} acquired a new piece of land on which a memorial route was planned. It is important to note that concentration camps did not only contain barracks and prisoners: on an aerial photograph of 1943, some trenches are clearly visible here, and some of the remains were still recognisable at the surface during the survey. Testimonies of local residents and the preliminary desk-based study resulted in some first conclusions. The trenches had (partially) been built by the mobilised Dutch Army in 1939, just before war broke out, for both military purposes and training. The site was not chosen by chance, as it is the highest ground of the region. After the capitulation of the Dutch Army, the trenches were used and extended by the Germans, again mainly for training purposes. The terrain was also consolidated with at least two concrete foundations for 20-millimetre (light) Anti-Aircraft Guns, probably to protect the nearby Amersfoort railway station. After the excavation, parts of the trenches were reconstructed.\textsuperscript{213}

In 2011, a pilot project – funded by the province of Gelderland and several municipalities – was started to examine the management of, research on and presentation of the archaeological heritage of WWII in the Netherlands. It served as a primary inventory for practical and legal problems when dealing with such remains.\textsuperscript{214} The main objective was a former German Flak-position\textsuperscript{215} near Arnhem. This Flak-position was constructed in 1943 for the protection of the airfield at Deelen and the important Diogenes bunker. The airport was quickly captured in May 1940 and already employed as a German airfield in June.\textsuperscript{216} By the end of the year, two concrete runways had been completed, after which a third concrete runway was constructed in February 1941.\textsuperscript{217}

\textit{Fliegerhorst} Deelen was used by night fighters, day fighters and bombers. In 1941, it also became the headquarter of the \textit{Nachttjagdgeschwader} 1 (NJG 1), whose main task was to protect Germany from Allied bombers. NJG 1 became the most successful night fighter unit of WWII. In 1943, Deelen became the nerve centre for the aerial defence of the Netherlands, the northern part of Belgium and the Ruhr in Germany. The so-called Diogenesbunker had a direct telephone line to Berlin. Similar bunkers were also erected at Stade, Grove and Metz. Next to the runways, light Flak-positions were constructed to combat low-flying fighter planes. Surrounding the airfield, four heavy Flak-positions were built, including the surveyed position, to bring down the Allied bombers at an altitude of 10 kilometres. Each of these four positions was permanently manned with approximately 150 soldiers. The surrounding area also featured ammunition depots, a canteen, barracks and sanitation facilities.\textsuperscript{218}

Several research questions were formulated, including: Which structures are still present? Is it possible to give a decisive answer as to which units manned the position, based on the findings? What were the daily lives of common soldiers like? No actual excavation took place, however, as the site was investigated by means of a metal detecting survey and a field walking survey. A portable Global Positioning System (GPS) was used to map all encountered features and finds. This project marked the first time that archaeologists systematically mapped an Anti-Aircraft position in the Netherlands. In total, they collected 353 artefacts that could be linked to WWII, including cutlery, tools, medical goods and (parts of) weapons. The archaeologists involved gained more knowledge as to how to recognise such structures and what quantities of finds to expect.\textsuperscript{219}

During the Battle of Arnhem (17–25 September 1944), heavy fighting took place at the so-called Oosterbeek Perimeter on the north side of the river Rhine. This 1-by-2-kilometre area was vital for
Allied supply drops and the perimeter had to be defended at all costs until the British XXX Corps had reached Arnhem in order to secure the bridges. However, the British bridgehead at Oosterbeek remained isolated due to the severe and unexpected counterattacks by troops of the II SS Panzer Corps.220

In 2011 and 2012, renovation works were conducted in the former perimeter at several creeks and ponds, guided by archeologists. Important aspects were the remains of the battle at the Oosterbeek Perimeter. The Battle of Arnhem is significant for local, national and international history. The goal of this study was threefold: (1) to secure archaeological features and findings that could not be preserved in situ, (2) to map the archaeological remains that could be preserved in situ and (3) to disturb the archaeological archive in the area as little as possible. Most of the finds were, in fact, related to WWII.221

With regard to WWII, the archaeological finds were somewhat fragmented. Some of them were thrown into the water on purpose after the war and others were collected illegally by treasure hunters. However, the expected course of battle was more or less visible in the finds. No human remains were discovered. Traditional archaeological methods and techniques were used, and a metal detector was used to detect weapons, munition and military equipment. During the survey, the archaeologists worked closely together with UXO/EOD222-certified personnel.223 In the Netherlands, anyone is permitted to obtain an explosive ordnance disposal certificate which remains valid for three years.224 However, this is still not common practice for Dutch archaeologists working with the remains of WWII.

Compared with the excavations at Little Bighorn, where the identification of individual rifles allowed researchers to trace the movements of those firearms on the battlefield,225 industrially produced weapons and firearms are much more difficult to link and identify. However, due to the distinctive impact on the percussion-cap on several .303-inch cartridges, it could be concluded that some bullets were fired by a Bren Light Machine Gun (LMG). All the ammunition was mapped by archaeologists and then handed over to EOD-specialists, who destroyed the findings afterwards. Weapons were transferred to the local Airborne Museum. Since these WWII weapons and ammunition were produced industrially in massive numbers and are well represented in existing (museum) collections, there is no direct archeological need to store such finds in an archaeological depot once documented. For the Airborne Museum, on the other hand, these finds were a tangible illustration of the experience of war.226

In the Netherlands, WWII defence structures also have started to receive more archaeological attention. At several sites, parts of the Atlantic Wall were investigated in recent years. The Atlantic Wall stretched from the cape of Norway along the coast of Denmark, Germany, the Netherlands, Belgium and France up to the Spanish border. Over 5,000 kilometres in length, this defence line was constructed between 1942 and 1944. Like the Westwall, the Atlantic Wall was not an interconnected defence line, but consisted of a range of strongholds, pillboxes, trenches, artillery positions and several other defence structures.227

Research began in 2013, at Katwijk aan Zee, where a carpark was to be built on top of remains of the Atlantic Wall. All eras were considered, including WWII. During the excavation, parts of an anti-tank wall were unearthed that was built between 1943 and 1945. It marked a rare find, as some of the camouflage painting was still present.228 At Noordwijk aan Zee, some debris of the Atlantic Wall was discovered unexpectedly during renovation works on the coastal promenade in 2016. Most likely, these

---

221 Van der Weerden and Verspay 2015, 4–5, 14, 27 and 51.
222 UXO: Unexploded Ordnance, EOD: Explosive Ordnance Disposal.
223 Van der Weerden and Verspay 2015, 4–5, 18–19, 22, 42 and 52–53; Wijnen et al. 2016, 25.
224 Stichting Examinering OCE.
226 Van der Weerden and Verspay 2015, 22, 33 and 42; Sagona and Birkett-Rees 2016, 83.
227 Van der Leije and Hamburg 2014, 45; Warmerdam and Kok 2017, 18.
228 Van der Leije and Hamburg 2014, 5, 47 and 51.
concrete parts were used as filling material and originated from another site. Nevertheless, the remains were documented archaeologically.229

In the same year, a third project was carried out near Noordwijk, with the goal of redeveloping a memorial site.230 The local Atlantic Wall Museum231 wanted to construct a walking trail along the remains of the German defence works. Archaeological research focused on the most vulnerable, non-hardened features, such as tank traps and trenches, and not, as commonly practiced, on concrete field fortifications. This study was funded by the province of Zuid-Holland.232 When combined, all these material remains form a landscape of warfare.233 During the desk-based research, 56 structures were marked in the area, but only four were actually located in the landscape during the field survey. Most of the features had been eroded, deliberately filled up or had disappeared due to sand drifts.234

One of the largest archaeological excavations ever conducted in the Netherlands with regard to WWII took place around the former transit camp of Westerbork in 2011. This camp has a remarkable history. Before the start of WWII, many German Jews started fleeing their country when Adolf Hitler (*1889–†1945) came to power. Between Kristallnacht, from 8 to 9 November 1939, and 10 May 1940, over 10,000 German refugees sought shelter in the Netherlands. In need for a solution to house these large numbers of refugees, a permanent camp was proposed near Elspeet. However, after protests by locals and a decisive veto by Queen Wilhelmina (*1880–†1962) the camp was built elsewhere: Westerbork, in the midst of uncultivated heathland.235

Between 1939 and 1942, Westerbork was a Jewish refugee camp. As of 1 July 1942, the camp was renamed Polizeiliches Judendurchgangslager Westerbork236 and the Sicherheitsdienst237 (SD) took completely charge of the organisation of the camp, after which Westerbork became a transit camp. Between 1942 and 1944, a total of 93 trains deported over 107,000 Jews to the German extermination camps in present-day Poland. Most prisoners were dispatched to Auschwitz-Birkenau; others were deported to Theresienstadt and Bergen-Belsen. A total number of 34,313 prisoners were sent from Westerbork to Sobibó, but only 18 of them survived.238

After WWII, Westerbork became an internment camp for Dutch citizens who had collaborated with the Germans. Between 1950 and 1970, the site was renamed ‘De Schattenberg’ and accommodated Moluccan families who had supported the Dutch government in the Dutch East Indies. When Indonesia became independent, they were no longer safe. From the 1980s onwards, Westerbork was transformed into a memorial landscape highlighting WWII and neglecting the post-war history of the site for a long time. Again, it is worth pointing out that public memory is very selective.239

The desk-based research started with a study of aerial photographs, maps, films and photographs. A division was made between the core area, containing all features within the former boundaries for the prisoners, and a peripheral region, such as the waste dump, a shooting range and the railway. The Westerbork Archaeological Research Project was considered an important pilot project. Prior to the excavation,

229 Baas 2016, 7, 19 and 25.
231 Atlantikwall Museum Noordwijk.
233 Saunders 2007, 159; Scott and McFeaters 2011, 117; Van der Schriek and Van der Schriek 2014, 229; Sagona and Birkett-Rees 2016, 83.
236 Jewish transit camp Westerbork, in charge by the (German) police.
237 Security Service.
238 Schute 2013a, 5 and 8; 2013b, 30; Schute and Van der Laan 2015, 20, 24, 26 and 29-30.
it was hard to predict what sort of finds could be expected or what the outcomes would be. The aim of the project was to map the layeredness of the material culture and to underline the emotional and symbolic value of the findings.  

After plans by the museum to rearrange the memorial landscape, eleven sites were selected for further investigation. This included the former residence of Albert Konrad Gemmeker (*1907-†1982), who was the commander of Westerbork from 1942 until 1945, and the waste dump just outside the camp. Trial excavations were only allowed nearby the residence and on the waste disposal site due to heritage regulations. Both are located in the peripheral region of the camp. Core samples were taken inside the camp area, and a total of 19,525 artefacts were unearthed from the waste disposal site. The excavation received a lot of attention from the general public. Most recovered artefacts were part of civilian furniture, and none of the findings could be linked to individuals, although some personal items, such as an engraved silver ring, were recovered.

During the archaeological investigation, some practical problems arose as well. Since the different functions of the site followed each other up quickly, it turned out it was very difficult to date the collected artefacts precisely: pre-war, wartime or post-war? Furthermore, there was very little experience and knowledge available on contemporary finds like medicine and perfume bottles or imprints on pottery. Third, interpreting the features and findings were hindered by looting. Many sites of modern conflict are damaged by treasure hunters. And last, findings were not classified on the materials objects were made of, like glass or wood, but determined on (main) function like clothing, medical or military. This system was used before during comparable excavations in Germany as well as in France in the 1990s when the grave of Alain-Fournier was located.

In the Netherlands, crash-sites gained attention from both amateurs as well as professional archaeologists. According to the loss index of the Study group aerial warfare 1939–1945 over 6,000 airplanes crashed on Dutch territory during the war. An average of three plane crashes a day, as of 1 September 1939 until 8 May 1945. An estimated 1,085 aviators are still missing on Dutch territory; most of them are lost at sea. Only those airplanes are included, both German and Allied, which were total losses after the crash and no longer useful at any point of the war. At present, approximately 80% is salvaged, most during or directly after the war. Unfortunately, just as it was the case in the United Kingdom, most of these airplanes were excavated by amateurs, damaging the archaeological context of the findings. Many of the objects found were sold on souvenir markets. Until 1996 it was in fact permitted to excavate remains of WWII planes as long as the landowner granted permission. On the other hand, when aircraft crash-sites are found in the Netherlands, it is not archaeologists but military specialists who investigate them. The site is thoroughly searched for possible human remains but this is still a form of soil sanitation. However, a part of the remaining crashed aircrafts is still to be discovered and can, hypothetically, be investigated in an archaeological way. The question is if archaeologist should guide such excavations or map the distribution of the plane preliminary to a salvage operation.

In other countries, aviation archaeology is presently more developed. Both the United Kingdom and the United States are using standard archaeological applications for mapping and excavating sites

240 Cf. Theune 2010b, 30-31; Schute 2013a, 8; 2013b, 8, 12 and 27; Schute and Van der Laan 2015, 17, 20 and 38-39.
241 Schute 3013b, 7, 9, 21, 49 and 74; Schute and Van der Laan 2015, 14-15 and 46-47.
242 Schute 2013a, 9; 2013b, 9 and 75; Bosman et al. 2014, 23; cf. Theune 2014, 57; Schute and Van der Laan 2015, 15.
243 Adam 2006, 114-115; Saunders 2007, 103; Schute 2013a, 10 and 15; 2013b, 9, 4, 39, 61-62 and 74.
246 WWII aircrafts are recovered by a unit of the Logistiek Centrum Woensdrecht.
247 Kamp and Hendriksen 2010, 76.
connected to aerial warfare. In the United States this branch of archaeology is much influenced by heritage management. Ethical issues, related to the excavation of human remains from crash-sites are also addressed. The archaeological goal of such excavations can be summarized to (1) recovery and conservation, (2) investigate the nature of the crash and (3) preservation of materials at the site.

In the Netherlands, some salvage operations of WWII aircrafts have been monitored by archaeologists (Table 4.1). According to several sources, archaeologists were present for the first time during a salvage operation of an American bomber, 400 meters off the coastline at Domburg, in 2007. Unfortunately, this research has not been published. In the municipality of Apeldoorn a German fighter aircraft was recovered in 2010 which was guided by archaeologists as well. Archaeologists were allowed near the wreckage twice a day to make notes, measurements and pictures. Due to the presence of ammunition and human remains the working competencies of the archaeologists was however limited. The wreck of a Messerschmidt Bf-109G-6 was recovered, the most used fighter by the Luftwaffe during the war. With a total of 33,984 airframes fabricated from 1936 up to the end of WWII, this was the most produced fighter plane in history. This particular plane crashed near the village of Wenum Wiesel at 30 January 1944 around 13:30 hours. Aside from parts of the engine, several on-board weapons and a propeller blade, human remains were also discovered. The remains of the aviator were later reburied at the German Military Cemetery of Ysselsteyn. During this pilot study the archaeologists tried to develop and answer some research questions but mainly this recovery was an opportunity to look at the possibilities, limitations and added value of archaeological research to air crash-sites in the Netherlands.

In the same year the wreckage of a Junkers 88 was recovered at Leidsche Rijn. At the 10 May 1940, over 500 German airplanes were shot down over the Netherlands, of which this aircraft was one. Almost 15,000 Junkers 88’s were produced in several variants during WWII (Fig. 4.20). Only fourteen planes of this type are preserved of which twelve are composed of various others. The preliminary survey pointed

<table>
<thead>
<tr>
<th>Year</th>
<th>Location</th>
<th>Type</th>
<th>Ser./W. Nr.</th>
<th>Unit</th>
<th>Crash date</th>
<th>MIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>North Sea (Domburg)</td>
<td>BF 109 G-6</td>
<td>410210</td>
<td>6./JG11</td>
<td>30-01-1944</td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>Wenum-Wiesel</td>
<td>B-17 G</td>
<td>42-106994</td>
<td>381BG/533BS</td>
<td>26-11-1944</td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>Apeldoorn</td>
<td>Ju 88 A-1</td>
<td></td>
<td>3./KG30</td>
<td>10-05-1940</td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>Zelhem</td>
<td>Lancaster III</td>
<td>ED470</td>
<td>61 Squadron</td>
<td>23-09-1944</td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td>Wapenveld</td>
<td>Halifax II</td>
<td>DT795</td>
<td>158 Squadron</td>
<td>04-04-1943</td>
<td>4</td>
</tr>
<tr>
<td>2014</td>
<td>Werkendam</td>
<td>Lancaster III</td>
<td>LM508</td>
<td>101 Squadron</td>
<td>22-06-1944</td>
<td>1</td>
</tr>
<tr>
<td>2016</td>
<td>IJsselmeer (Lemmer)</td>
<td>Wellington Ic</td>
<td>R1322</td>
<td>305 Squadron</td>
<td>09-05-1941</td>
<td>3</td>
</tr>
<tr>
<td>2017</td>
<td>Alde Feanen</td>
<td>Lancaster III</td>
<td>R5682</td>
<td>61 Squadron</td>
<td>05-09-1942</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 4.1. WWII crash sites monitored by archaeologists (Information kindly provided by Major B. Aalberts, Royal Netherlands Air Force).

248 Deal et al. 2015, 9.
250 Van der Kamp and Hendriksen 2010, 24.
251 Nowarra 1993, 189.
252 ANP 2010a; 2010b; Van der Kamp and Hendriksen 2010, 24; Van der Schriek and Van der Schriek 2013b, 30.
out that archaeological support provided unique and valuable new information. Therefore it was decided to include archaeologist during the salvage operation. Starting point for each salvage operation is historical research. What type of aircraft is to be recovered? Who were the crew-members? The results are used for a risk-analysis with regard to expected live ammunition as well as the possible presence of human remains.²⁵³

Are WWII air crash-sites of national importance and should they be considered as archaeological monuments? In the United Kingdom the value of such sites are evaluated by means of four criteria: (1) Does the site contain the remains of an aircraft of which no (complete) examples are preserved? (2) Are the remains well preserved and are the main components (for instance engine, fuel tanks and fuselage) still present? (3) Is the aircraft connected to an important campaign, specific attack or famous person? (4) Is it possible to restore the remains for exhibition and use the site as a memorial place? If a site meets three of the above mentioned criteria, the site is considered as of national importance.²⁵⁴ During the archaeological research of the Junkers 88 at Leidsche Rijn, the archaeologists involved used the same criteria. According to this ratings system the wreckage should be considered as an important (national) site. Hardly any Junkers 88 is preserved, the archaeologists expected that the remains were in good condition and the plane was shot down during *Fall Gelb*²⁵⁵ (10 May–25 June 1940), the invasion of the Low Countries and northern France.²⁵⁶

Due to its location, this wreckage was the ideal starting point for another pilot study (Fig. 4.21). In the midst of meadows, the location was easily accessible. However, it was likely that not many metal detector-
Archaeologists had searched the area. Archaeologists had the opportunity to get familiar with the salvage process by military specialists and, reversed, the military specialists got acquainted with archaeological practices. As usual during a salvage operation of a WWII airplane, military specialists were in charge and conducted the actual excavation. Two municipal archaeologists were allowed at the site that had to disrupt the operation as little as possible. For safety reasons, the site was divided into three zones. In the inner core only UXO/EOD-certificated personnel was allowed. The archaeological guidance of the salvage operations at Leidsche Rijn was in fact very promising. The cooperation between archaeologist and military specialists did yield new information about the crash-site which would never have been mapped during a regular salvage operation. The soil composition, the crater of the crash, the depth as well as the distribution of sections of the Junkers 88 was all recorded archaeologically (Fig. 4.22). The wreckage was distributed over a larger area than expected.

At the end of the year, a third WWII wreckage was recovered. This American Boeing B-17 Flying Fortress, a four-engine heavy bomber, was nicknamed Little Guy by its crew and crashed on 27 November 1944. The plane took off from an airfield at Ridgewell, Essex, United Kingdom, to take part of a bombing campaign at the city of Altenbeken, Germany. Already after an hour one engine failed due to oil leakage. The plane therefore deviated for another bomber group heading for Osnabrück. On its way back two other engines ceased as well and the B-17 crashed near Apeldoorn.

During the salvage operation which was guided by archaeologists once again it became quickly clear that no large components of the aircraft were still present at the site. Most likely the wreckage had already been dismantled by German troops. The archaeologists were able to map the distribution of the remaining parts of the wreckage. As usual, the site was divided into three zones by the Dutch Army again for

---

257 Van der Kamp and Hendriksen 2010, 24, 31 and 71
258 Flokstra and Kok 2011, 5-6, 11 and 20.
safety reasons. Most archaeological information was derived from a metal detecting survey. The findings were mapped by means of GPS. Due to the restrictions, it was difficult to link recovered parts of the wreck with the features.259 A very unique salvage operation in which archaeologists were involved was conducted in 2016 when a Vickers Wellington was recovered from the bottom of the IJsselmeer. The human remains of three Polish crewmembers were collected and identified.260

In the Netherlands, too few WWII airplanes have been monitored by archaeologists to be able to state whether or not archaeology can add new information or to develop excavation protocols and a research agenda to this specific topic. However, according to aviation specialists, WWII plane wreckages are corroding quickly and are also far less preserved than 25 years ago. Due to the degree of degradation and the decreasing number of wreckages, archeological research is justified. The participating archaeologists of the pilot study at Leidsche Rijn therefore recommended that the salvage of WWII airplanes should be monitored by professional archaeologists as well in the future.261 Nevertheless, this is still not common practice. In 2018, the Dutch Government announced that up to 30 wreckages will be salvaged in the following years in order to collect the possible human remains. Military specialist only have the capacity to recover three aircrafts a year. It is not known if and on how many occasions archaeologist will be allowed to guide the salvage operations, a decision which will be made by the respective municipalities. Up till present, there is no agreement between archaeologists and military specialists for future cooperation.262

259 Van der Kamp and Hendriksen 2010, 31; Flokstra and Kok 2011, 6-7, 27, 40 and 51-52.
260 Boomsma and Kok 2017, 5.
261 Mortier and De Decker 2009, 21; Van der Kamp and Hendriksen 2010, 25 and 76.
262 Flokstra and Kok 2011, 57.
4.7 Conclusions

In this chapter, an indication is given of both the archaeological and historical potential of landscapes of modern conflict. In the regions discussed above, there are some distinctive parallels and differences when it comes to conducting conflict archaeology. As already stated in chapter 2, the origins of conflict archaeology should be traced back to different historical and national settings. It can be concluded that, in most countries, conflict archaeology developed almost independently from the Anglo-Saxon tradition. Nevertheless, the motives for archaeological research are largely the same. First, conflict archaeological research was prompted by the interest of the wider public. Second, personal interests of individual archaeologists in modern conflict archaeology appear to have been an important driving force. Third, public media have played a major role in the increasing popularity of conflict archaeology, with media coverage also creating a shift of awareness amongst professional archaeologists. Only at a later stage did academic funding agencies and development-led archaeology stimulate conflict archaeological research.

In the United Kingdom, the excavation at Towton (1997) was the first conflict archaeological study of its kind. Its chief inspiration, however, was the study conducted at the modern conflict site of Little Bighorn in the United States and not previously performed conflict-related archaeological excavations within the UK’s own national borders. In the United Kingdom itself, archaeologists are mainly focused on medieval (historic) battlefields. In Flanders, on the other hand, professional archaeologists first started researching modern conflict sites with traditional excavation methods. Later, new non-invasive techniques such as image warping were developed.

In most countries discussed in this chapter, modern conflict archaeological research was dominated by sites related to WWI. Accordingly, sites related to the WWII era were overshadowed at first, though they would gradually come into the picture later. The Netherlands is not home to any traumatic WWI landscapes and could therefore obviously not push forward archaeological research into WWII. Second, in contrast to WWI-related sites, conflict sites of WWII can be regarded as contested, such as the remains of the Atlantic Wall or former concentration camps. When working on such contested sites, numerous political, social, and ethical questions arise. Third, this chapter demonstrated that almost all conflict archaeological studies focused on micro-scale analysis and relied heavily on excavations, typically including no further analysis of the surrounding landscape. Conflict sites are rarely studied as a part of a far larger militarised landscape. Last, each country involved in a conflict had its own narrative regarding the event and hardly ever focused on sites behind the former frontline, as the study on a cesspit in the city of Aalst shows. Only recently has a more scholarly assessment been implemented.

Although community interest has on many occasions been of vital importance for the study and preservation of conflict sites, professional archaeologists continue to struggle with engaging with their non-academic audience. For a part, community interest is also expressed through illegal excavations and metal detecting raids, as will be explained in detail in the following chapter. In the Netherlands, conflict archaeological research also has its roots in non-professional spheres. Nevertheless, several studies, including the Defence of Britain project (1995–2005) and the Westerbork Archaeological Research Project (2011), have proved that academics, local authorities and amateur enthusiasts can engage in high-level collaboration.

Archeological research can add new storylines and perspectives to the historical narratives or recover previously unknown information pertaining to sites of modern conflict. The commemorative significance of landscapes of modern conflict is increasing. Archaeology can also play an important role in cultivating the present experience of a former site of conflict. In the countries discussed, the added value

263 Roymans and Fernández-Gótz 2018, 3.
of conflict archaeology is no longer questioned, and sites of modern conflict are now considered integral parts of national archaeological heritage. Excavations have underlined the importance of archaeological research. In the United Kingdom, Flanders, France, Germany and Poland, archaeologists can work on sites where human remains are most likely present – in contrast to the Netherlands. Obviously, human remains are to be handled with the appropriate respect and technical skill. In the relevant regions, it is also much more common for archaeologists to work together with EOD-certified personnel. In France, for instance, archaeologists take courses to learn how to identify different types of ammunition themselves.

Have studies abroad had an impact on conflict archaeological research in the Netherlands? Strikingly, there has been an identical focus on excavating famous battlefields (Grebbeberg), camp sites (Amersfoort, Westerbork) and defence structures (Atlantic Wall) in the Netherlands. Nevertheless, conflict archaeological research remains highly fragmented, as demonstrated by the excavations presented in this chapter. Although remains of WWII were excavated as chance finds and reported as bycatch as early as 1984, only in 2008 was an excavation carried out in which the remains of modern conflict were included as compulsory elements. Still, no research questions were formulated. An important pilot study was conducted in Gelderland in 2011. This study served as a primary inventory to examine the management of, research on and presentation of the archaeological heritage of WWII. However, no excavations were carried out during this study. In the Netherlands, WWII conflict sites are often not treated equally to their ancient counterparts.

To conclude, the Netherlands can benefit from experience gained and techniques developed abroad. At the same time, research conducted by Dutch archaeologists can also inspire foreign researchers. As will be discussed in more detail in chapter 6, excavations are not always the most productive strategy. For the study of recent military landscapes, remote sensing data hold great potential. However, conducting conflict archaeology in the Netherlands is severely hampered by both local and national laws and legislations, as will be discussed in the following chapter.
Chapter 5 – Scientific and societal importance

5.1 Archaeological heritage management in the Netherlands

The first part of this chapter deals with the legal background of heritage management and conflict archaeology in the Netherlands, connecting research with policy, development and the public. When valuing archaeological monuments, meaning is implicitly given to those features and artefacts. Although the Dutch regulations are outlined here, the central focus of this chapter is the valuation of sites of modern conflict. How are these sites represented? How are they valued? Can they be used as a point of reference for other countries? Archaeological heritage management in the Netherlands is concerned with the identification, protection, management and preservation of features and artefacts of human activity, ranging from prehistory up to modern times. As discussed, heritage is closely tied up with the values and identities of contemporary society and local communities. Heritage is never an objective historical given, and both memories and constructed histories need to be understood within the context of the present. Heritage is to be regarded as a subjective perception of the past. People give meaning to places in the landscape (for example a tree, a house, or a monument), which anchor them to their living environment, and which were and are of key importance for the identity of a local community. Landscapes provide a vital link to the past and stimulate the consciousness of historical events.

As explained in chapter 3, a reciprocal and historically grounded relationship exists between communities and landscapes. In the perception of individuals, the landscape generates both the symbols and the means through which communities define themselves and represents a sense of identity and belonging. Societies change over time and so does the attitude towards their heritage. Heritage is often contested and is made up of both material and immaterial culture, which is cultivated by different individuals and social groups. Histories of blooming times are presented more often than histories of deterioration. This often results in an idealised past, the way people would like to see the past, not how it really was. Heritage is by its very nature selective. Both individuals and communities can experience places of memory in entirely different ways. Of course, experiences and opinions are based on and coloured by modern political events, nation states, (local) heritage management and multiple other social factors.

Another complicated relation exists between the general public, academic research and heritage policy. For instance, the tourist value of a given piece of heritage can differ from the academic value. For some, the remains of WWII are part of their identity. Others feel little connection to events outside their lifetime or do not want to see a darker past of history turned into a tourist attraction. Some people, like the Jewish community, may feel cultural affiliation. These sites can also represent areas of reflection and

3 Suleiman 2006, 167; Miles 2016, 133; Van der Schriek 2019, 100.
4 Gerritsen 2003, 113; Smith 2006, 48, 77 and 83; Login 2015, 17.
6 Cf. Lowenthal 1996; Misztal 2003, 60, 79; Suleiman 2006, 1; Rass and Lohmeier 2011, 196-197.
7 Moshenska 2010, 40; Sturdy Colls 2012, 76; Miles 2016, 68; Van der Schriek 2019, 99.
commemoration to one group and to others they are simply remains of a distant past. After WWII, Dutch rural landscapes urbanised very quickly. Archaeological research was not obligatory and, in general, there was only limited concern for archaeological remains at all layers of government (municipality, province, national). Larger municipalities only excavated those remains which they considered to be important. A large part of all archaeological research was, in fact, conducted by the Dutch Society of Archaeological Volunteers (AWN). In the 1970s, a major shift occurred in society’s attitude towards archaeological heritage, both in the Netherlands as well as in the rest of Europe. Archaeological monuments were no longer primarily seen as objects of study but were now considered as ‘cultural resources’ which could be used and benefited from in the present and future, a fundamental notion. The main focus shifted from preservation to interaction: cultural history was now an integral part of the development of a site and not simply a reflection of the past. Before, specialists on archaeological heritage management had mainly conducted rescue archaeology – merely safeguarding vulnerable and important archaeological sites against the ongoing threat of destruction.

Dutch archaeological legislation is based upon the principles of the Valetta Convention (16 January 1992), i.e. to protect archaeological heritage as a source of collective memory and as an instrument for historical as well as scientific study. Developers are obliged to assess the impact of their plans on potential archaeological heritage and to fund any necessary archaeological research. Paradoxically, in order to protect archaeological heritage, archaeologist have to work together with developers. The valuation process is used to determine if an archaeological monument is classified as significant and whether or not an excavation should take place. Since the implementation of new national legislation, archaeological features and findings have been much better protected during spatial developments. The first national Monuments Act of the Netherlands was implemented in 1961. Attempts to create an Act for the protection of monuments were already undertaken as early as 1910. The Monuments Act of 1961 was replaced in 1988 in order to involve provinces and municipalities more and has been modified repeatedly since then. Since 2007, municipalities have been explicitly made responsible for the archaeological heritage within their administrative borders.

The landscape biographical approach (as discussed in chapter 3) has been used as a selective tool to provide an indication of what to protect – or not. Further, this approach integrates archaeological sites and spatial development. A valuation system was developed which is now used by all governmental authorities (national government, provinces and municipalities). Above all, the system needed to be clear for non-archaeologists as well. Prior to the development of this valuation system, archaeological heritage management was mostly restricted to professional archaeologists who believed they were the guardians of the public interest in preserving the past for the benefit of future generations. Today, archaeological management is

---

9 Sturdy Colls 2012, 76.
10 Deeben et al. 1999, 194; Van der Schriek and Van der Schriek 2013b, 26.
11 AWN: Vereniging van Vrijwilligers in de Archeologie.
14 The national Monuments Act (Monumentenwet) was in the first place aimed at the protection of the remaining archaeological features and findings, at best in situ.
15 Tillema 1975, 4, 502 and 524.
16 Teters 2013, 25; Luinge 2014, 5; Bosman et al. 2014, 45; Schute and Van der Laan 2015, 73.
based upon a valuation and selection process on several levels, known as the Archaeological Monument Care (AMZ)\textsuperscript{18} cycle (Fig. 5.1) which is structured by the interaction of scientific knowledge, policy and imagination. Such a valuation system was needed, since any decision made could not be based solely on the subjective judgement of archaeologists or heritage managers, as was common until the 1980s.\textsuperscript{19}

In the Netherlands, regulations have been introduced to oblige those responsible for the disturbance of an archaeological site to pay for the compulsory archaeological research in order to determine the archaeological value of a site. An archaeological research project always starts with desk-based research, which is then followed up by an inventorial field survey if needed. After the field survey, the decision can be made to (1) release the site for further development or (2) conduct an archaeological excavation. If a site has major archeological prospects, is under threat and cannot be preserved, it is always excavated.\textsuperscript{20} During the valuation and selection process, several standard criteria are used to make a careful decision. Of course, it is impossible to guarantee long-term preservation of all known archaeological remains. When the archaeological value has been determined, the first assessment of the selection is based on the perception of an archaeological monument: (1) aesthetic value and (2) commemorative value. Secondly, an assessment will be made on physical criteria: (3) intactness and (4) conservation. Last, an assessment of the intrinsic value follows: (5) rarity, (6) research potential, (7) context or group value and (8) representativeness. On the basis of this valuation procedure, a selection proposal is drawn up with scores ranging from low to medium and high. Each level of government (municipality, province, national) will make its own policy decisions. Some sites may not be considered of importance at a national level but may be of great local concern. The national government will stipulate whether sites worth preserving are of national or even of international significance. Obviously, the debate on valuation and selection is an ongoing process.\textsuperscript{21}

\textsuperscript{18} AMZ: Archeologische Monumentzorg.
\textsuperscript{19} Deeben et al. 2002, 451; Bloemers 2010, 3.
\textsuperscript{20} Willems 2007, 46 and 56; Teters 2013, 25; Van der Leije and Hamburg 2014, 5; Luinge 2014, 37; Schute and Van der Laan 2015, 23 and 77; Wijnen et al. 2016, 24.
\textsuperscript{21} Deeben et al. 1999, 177-178, 180-184 and 190; 2002, 451 and 459-460; Van Londen 2006, 172 and 174; Kok and Vos 2013 (red.), 41; Leije and Hamburg 2014, 64; Schute and Van der Laan 2015, 147; Bosman et al. 2017, 34.
Aesthetic value, however, is barely used as a criterion to assess sites and it is often translated to visibility. After all, visible monuments form a more powerful reminder of the past. However, it is crucial that researchers, policy makers, developers and the wider public are aware of the fact that visible archaeological monuments are only the tip of the iceberg. Characteristics of both the monument itself as well as its immediate surroundings are taken into account during the decision-making process. With regard to WWII sites, the category commemorative (or historical) value is of main importance. Sites connected to WWII form a rare category of archaeological monuments which can be linked directly to historical events (Fig. 5.2). On the one hand, sites of modern conflict are increasingly being regarded and valued as important heritage, but, on the other hand, spatial developments still threaten these very same landscapes with little thought for scholarly research or proper recording. The archaeological remains of WWII were not mentioned specifically and for long not regarded as part of the (inter)national archaeological heritage of the Netherlands. Are these vulnerable remains sufficiently protected by present legislation? How do we manage the material heritage of WWII? In Scotland, for instance, several mechanisms were set up over the years to protect archaeological sites and historical buildings. However, many turned out to be inapplicable for sites of modern conflict. Development on historic battlefields, for instance, is currently not prohibited in the United Kingdom.

Fig. 5.2. Foxholes of F Company, 2nd Battalion, 501st Parachute Infantry Regiment, 101st Division, near Bois Jacques in the former perimeter of Bastogne, 20-27 December 1944 (Author).

22 Bloemers 2010, 4.
23 I.e. when archaeological features can be linked directly to historical events.
24 Deeben et al. 1999, 183.
The Archaeological Monument Care (AMZ) is principally geared towards both protection and research. However, some archaeological monuments are clearly underrepresented in terms of type, era or geographical context.\(^26\) Only very few WWII conflict sites in the Netherlands are actually considered an archaeological monument, although such sites are often reckoned to have a high societal value. ‘Negative’ or contested heritage places like German concentration camps, massacre sites, war memorials and prisons should also be taken into account in order to represent all aspects of the local heritage.\(^27\)

All known archaeological sites in the Netherlands are recorded digitally in a central database, the Archaeological Information System (Archis).\(^28\) In November 2017, this database contained 402,034 individual classifications, comprising both artefacts and archaeological features. Each single classification can consist of at least one discovery, but it can also contain ten, 100 or over a 1,000 features and artefacts.\(^29\) The precise location of a site, its nature (for instance a burial mound or a Roman settlement), features and findings, the status of each individual site (protected or not) as well as the locations of archaeological excavations on the site itself are all documented. Furthermore, Archis combines several sources, including topographical maps, geographical features, land use, the national Archeological Monuments Map (AMK)\(^30\) and the Indicative Map of Archaeological Values (IKAW).\(^31\) On the AMK, all known archaeological sites are mapped until approximately the end of the 20th century. Nowadays the AMK is more or less static: archaeological sites are usually removed from this database and only sites that have received a protected status are added. The IKAW is based on geomorphological information and gives an indication of the location of areas with a high, medium or low prediction value on a national level. These valuations are only an indication if there is a high, medium or low chance of discovering archaeological remains.\(^32\)

In addition, there are provincial archaeological maps available, which are usually more detailed than the above discussed maps. Many municipalities have their own archaeological maps, which are usually the most accurate. These maps are, for obvious reasons, the standard maps used by archaeologists.\(^33\) All predictive archaeological maps can be used for policy planning and are an indication for the likelihood of finding archaeological remains in a particular area.\(^34\)

Most (local) authorities have formulated a policy plan with regard to the conservation and research of archaeological monuments. Municipalities play a crucial role.\(^35\) In the Netherlands, a distinction can be made between archaeological monuments of national, regional and local importance.\(^36\) However, for a long time, WWII was neglected and kept off the archaeological record, which is why it is now underrepresented. The total number of archeological sites related to both WWI and WWII is currently unknown for the Netherlands. At present, more and more archaeologists are starting to become convinced that sites of modern conflict should not only be regarded as heritage, but also as archaeological heritage.\(^37\)
How do Dutch archaeologists currently value archaeological features of modern conflict? Do the discussed selection criteria also apply to these sites in particular? During an archaeological survey at the Grebbeberg in 2008, the material remains of WWII were recommended for protection. The site scored ‘high’ on perception values, i.e. aesthetic value and commemorative value. In this particular case, the selection and valuation system turned out to be applicable for an archaeological site of modern conflict. However, one bottleneck in the current selection process with regard to modern conflict is the fact that the meaning of features and findings of WWII usually go beyond their academic value.38 Some relatively recent pots, pans, bottles and cutlery are commonly not considered interesting objects for academic archaeological research, but with the knowledge that they belonged to prisoners in the former concentration camp of Vught (1943–1944), the same items were valued completely differently and are now on public display (Fig. 5.3).

Several Dutch archaeologists involved with features and findings of WWII have suggested an adapted version of the current valuation and selection system. In general, the present system can be applied to sites of modern conflict in the Netherlands. However, the perception of archaeological monuments of WWII should be subdivided in (1) commemorative value, (2) educational and recreational value, (3) emotional value and (4) symbolic value. In order to determine the physical and intrinsic value, the present criteria can be maintained. Rarity and group value will remain the most important valuation criteria. A careful valuation and selection of archaeological monuments linked to WWII can only be properly made if one knows what to expect in a particular area. Obviously, not every site with features and findings of

modern conflict is to be preserved. It is therefore highly recommended to include all known features and findings of modern conflict into the national archaeological database (Archis), as well as on provincial and municipal archaeological maps.\footnote{Kok and Vos (red.) 2013, 41–42, 44, 137 and 144; Van der Leije and Hamburg 2014, 47.} In 2015, a supplementary map was launched, the Indicative Map for Military Heritage (IKME),\footnote{IKME: Indicatieve Kaart Militair Erfgoed.} at the initiative of the commercial archaeological company RAAP Archeologisch Adviesbureau. In 2000, the government of Canada published the ‘ Vimy Declaration for the Conservation of Battlefield Terrain’ for protection, management and presentation of sites of modern conflict. The main objective (Article 2) is: “to reconcile the goals of commemoration, conservation, presentation, visitor safety, and site management in such a way that battlefield terrain and related features are protected and contribute to visitor understanding and appreciation of the site.” The perception of a conflict site will change over time and these sites therefore need some form of protection so that future visitors and scholars will be able to test new hypotheses and insights (Article 11).\footnote{Veterans Affairs Canada 2000; cf. Kok and Vos (red.) 2013, 52; cf. Bosman et al. 2014, 107; cf. Miles 2016, 116–117.} These are legitimate questions for modern conflict sites in the Netherlands too.

It can be concluded that the present valuation and selection system for archaeological monuments is also applicable to sites of modern conflict. Although some adjustments are recommended, modern conflict archaeology fits comfortably within the current model of archaeological heritage management.\footnote{Kok and Vos (red.) 2013, 41–42, 44, 137 and 144; Van der Leije and Hamburg 2014, 47.} However, the conservation and protection of landscapes of modern conflict is, generally, rather difficult. The lack of directly visible or recognisable remains is one of the main reasons that such sites have often not been officially recognised as archaeological heritage. In the Netherlands, WWII sites have a distinc-

Fig. 5.4. The Dutch military cemetery (1940–1945) at the top of the Grebbeberg (Author).
tive physical legacy of aircraft crash sites, remains of concentration camps, concrete bunkers, ammunition depots and trench systems, for example. Furthermore, there are several other commemorative layers, such as military cemeteries (Fig. 5.4) and memorials of various nations, which were built after the war but which are an integral part of present landscapes of conflict.43

5.2 Dutch Excavation Protocols

The Valetta Convention of 1992 improved archaeological legislation in the Netherlands in two main ways, namely introducing (1) the obligation to consider archaeological monuments during spatial development processes (article 5 of the Valetta Convention) and (2) the commitment for developers to fund compulsory archaeological research (article 6). Unfortunately, another important topic was not translated into national legislation, namely improved communication with the general public (article 9). Archaeological research should be visible and accessible to anyone in order to create the widest possible societal consensus. The implementation of the discussed principles of the Valetta Convention into Dutch archaeological legislation resulted in changes to the national Monuments Act (1961, revised in 1988) in 2007. All archaeological features and artefacts older than 50 years were considered part of the archaeological archive of the Netherlands.44 For a long time, 50 years was generally accepted as the minimum period of time needed to create an historical perspective on past events.45 In 1995 however, half a century after the end of WWII, the remains of this war had still not been incorporated into standard archaeological research. The Monuments Act was revised again in 2012, after which archaeological remains no longer had to be 50 years old, but could also be younger.46

In July 2016, the new Heritage Act47 came into effect. On top of that, the Environmental and Planning Act48 is expected to enter into force in 2021.49 Basically, the former Monuments Act has been split up, and both the Heritage Act and the Environmental and Planning Act will seek to modernise and above all simplify the current rules on land use planning, environmental protection and nature conservation, building construction and the protection of cultural heritage. The main archaeological modifications are the abolition of excavation permits and the introduction of certificates.50 Excavation permits used to be granted by the Cultural Heritage Agency (RCE)51 of the Netherlands, but since 2017, these permits have only been granted by certified accreditation agencies to archaeological enterprises. Both Acts will accentuate professional standards in the field, based on an independent archaeological quality control system and the registration of actors.52

The largest municipalities usually have their own archaeological service to conduct research within their administrative boundaries. A major advantage of municipal archaeologists is that they have extensive knowledge of their own municipality and will usually find local information much quicker than commercial archaeologists. After the Valetta Convention, the Dutch government decided to open up the archaeological market to commercial archaeological companies, leading to decentralisation (from government to governance) and marketing. Developers are not obliged to have municipal archaeologists

42 Cf. Moshenska 2008, 161; Kok and Vos (red.) 2013, 41, 137 and 144; Bosman et al. 2014, 81.
43 Cf. Miles 2016, 117-118.
46 Kok and Vos (red.) 2013, 19; Bosman et al. 2014, 16, 24 and 45; Luinge 2014, 8.
47 Erfgoedwet.
48 Omgevingswet.
49 Hogenbirk 2014, 14; Baas 2016, 7.
50 Article 5.3, Article 5.4 and Article 5.5 of the Heritage Act.
51 RCE: Rijksdienst voor het Cultureel Erfgoed.
carry out archaeological valuations and they can hire a commercial archaeological company instead. Most developers will experience archaeological research as a time-consuming and money-consuming affair that is to be conducted as quickly and, preferably, as cheaply as possible. Archaeologists have to comply with municipal, provincial and national governmental policies and have to meet the standards of the independent archaeological quality control system.\textsuperscript{53}

Not all discovered archaeological features and artefacts can be regarded as being of equal importance. However, municipalities can decide that a particular era should be prioritised during an excavation if that era is of great importance for the region, for instance.\textsuperscript{54} Such decisions are included in the local municipal archaeological policy. Main criteria for this selection are the previously discussed perception of an archaeological monument, its physical condition and its intrinsic value.\textsuperscript{55} As discussed in chapter 4, not many municipalities currently consider WWII remains as being of archaeological importance, but a change can be noticed. Although these remains can be included in and protected by the current archaeological selection system, it is still not common practice.\textsuperscript{56}

Only larger municipalities still have their own archaeological services. For smaller municipalities, this is simply too expensive, which means they typically depend on commercial archaeological companies. Since 2010, almost all archaeological excavations have been carried out by commercial archaeological enterprises.\textsuperscript{57} In fact, academics (i.e., universities) are legally barred from conducting archaeological excavations, as this would be regarded as unfair competition. Is there still a profound empirical basis? Some Dutch archaeologists, like Willem Willems (*1950–†2014), have argued that the current archaeological practice has experienced a significant quality loss due to the competition between commercial archaeological companies. Although contractors are obliged to strictly observe various requirements, free market processes have had a clear impact.\textsuperscript{58} In 2010, the \textit{Stichting Infrastructuur Kwaliteitsborging Bodembeheer} (SIKB) calculated that an average minimum rate for an archaeological excavation should be between €8 and €40 per square metre.\textsuperscript{60}

In 2015, an important prehistoric burial site of the Funnelbeaker culture (3300-2800 BC), as well as remains of the Merovingian period were discovered at Dalles (Overijssel). The predictive archaeological maps of the region demonstrated beforehand that this particular site, where new houses had been planned, had great archaeological prospects. Between 2011 and 2015, the compulsory archaeological survey was conducted. Since the municipality of Dalles was the developer itself, it also had to cover these costs. At first, desk-based research was conducted and drilling was done on site, confirming the site’s major archaeological potential. Trial excavations, which only covered 4% of the planning site,\textsuperscript{61} revealed that the present archaeological monuments deserved to be preserved.\textsuperscript{62}

The site also scored highly on context and group value. The archaeological remains represented a continuous history from the Neolithic farmers up to modern times. The burial site contained at least eight and up to twenty-five individual inhumation graves, making it the largest known Neolithic burial site in the Netherlands (Fig. 5.5). Therefore, the archaeological remains could be of regional or even national importance according to the report that was drafted after the first results. The archaeologists recommended further research, but the final verdict belonged to the municipality, which decided not to follow this advice.\textsuperscript{63}

\textsuperscript{53} Willems 2007, 48 and 52; Bloomers 2010, 7; Verspay 2010, 8; Wijnen \textit{et al.} 2016, 24.
\textsuperscript{55} Teters 2013, 26; Luinge 2014, 22.
\textsuperscript{57} Teters 2013, 26; Wijnen \textit{et al.} 2016, 24.
\textsuperscript{58} Willems 2007, 52 and 54-55.
\textsuperscript{59} Foundation Infrastructure for Quality Assurance of Soil Management.
\textsuperscript{60} Bazelmans 2016a, 23.
\textsuperscript{61} A coverage of 5% to 10% is recommended for trial excavations. Pers. comm. Daniël Stiller.
\textsuperscript{62} Bazelmans 2016a, 20-22.
\textsuperscript{63} Bazelmans 2016a, 22-23.
In the decision-making process of the municipality of Dalfsen, three scenarios were discussed, namely (1) to excavate all archaeological remains, (2) to excavate five important locations or (3) to excavate the two main locations containing the prehistoric and Merovingian burial sites. The minimum costs were calculated at €76,000 and maximum costs could amount to €660,000. In the first scenario, the remains would be excavated as completely as possible. In the second scenario, group context was of main importance. In the final option, only the rarest remains would be excavated. In situ protection of the archaeological remains was never considered as an option. However, it should be noted that legislation does not explicitly forbid development on such important archaeological sites. Each municipality has the legal right to prioritise other matters above archaeology. Eventually, the municipality opted for the third scenario, making €145,000 available to excavate an average of 26,500 m² of land, corresponding to a rate of approximately €5 per m², less than the estimated minimum costs of €8 to €40 per m² for an average excavation. The excavation was only successful because of the efforts of both students and volunteers who helped the professional archaeologists. The use of non-professionals was also the reason that the excavation could be carried out for less than what other archaeological companies would have charged. Eventually, 33,000 m² of land was excavated in ten weeks’ time, and during the excavation, the burial site turned out to be even larger and more exceptional than had been estimated beforehand.

Because developers are obliged to have archaeological research carried out, there has been an increase in archaeological excavations over the past twenty years. The first evaluation of this system, carried out in 2005, demonstrated that improvements were needed: some excavation reports were of poor quality, there was a lack of specialised research and there was usually not enough money available for the con-

---

64 Bazelmans 2016a, 23-24.
65 Pers. comm. Daniël Stiller.
servation, restauration and storage of the uncovered artefacts. Furthermore, as archaeological research became more widespread, municipalities, developers and farmers were forced to incur major expenses, and many archaeological studies have not been published or remain unread and unsynthesised.67 Nevertheless, academics have to bear in mind that excavation reports are only the basis for further academic research – synthesis is not their main purpose.68

Archaeologists should acknowledge that farmers, developers and politicians all have different priorities. Archaeologists have to interact more with these different groups and try to balance the various interests at stake. Ignorance on the part of municipalities and developers can lead to unnecessary archaeological research and panic when a feature or artefact of high archaeological value is discovered – as illustrated by the case study of Dalfsen.69 Of course, the current Dutch archaeological system has also had various positive outcomes. Since all excavation reports have to be published within two years, the number of high-quality reports also increased, simply because of the quantity of publications. The increase of excavations has also added to our knowledge.70 Over the past twenty years, archaeologists have uncovered many remains of WWII, fueling an expanding interest in the remains of contemporary archaeological eras and providing hands-on experience with such features and artefacts.71

It should not be a problem to include archaeological remains of WWII in the Dutch excavation protocols. However, due to the very nature of conflict archaeology, research into the remains of WWII does have to deal with several national and local laws. At present, remains of both World Wars are not generally accepted as part of the archaeological heritage of the Netherlands and are therefore not represented in any of the archaeological regulations and protocols.72 First of all, problems arise with regard to archaeological property rights. Laws concerning the ownership of archaeological finds vary in different countries.73 According to article 5.7 of the Dutch Heritage Act (2016), an excavated archaeological artefact belongs to the municipality or province where it was unearthed, unless somebody can prove a legitimate claim. These artefacts represent the general interest of the national identity.74 However, Allied army equipment (including tanks) still belongs to its country of origin. In practice, though, the former Allied nations will often abandon any claim. To German army equipment, other regulations apply. On 20 October 1944, the resolution ‘Hostile Property’ came into effect,75 stipulating that all German property within the borders of the Netherlands belonged to the national government as ‘spoils of war.’ Personal belongings of WWII victims who can be identified are still rightfully owned by their relatives, on the other hand. In an agreement with the Commonwealth countries (10 July 1951), the United States (4 May 1970) and Germany (15 April 1976), the official decision was made to return all personal belongings to the next of kin.76

Second, archaeological protocols can also be in conflict with Dutch legislation on weapons and munition. As stated in the Monuments Act, archaeologists do not have permission to excavate, store and preserve materials such as firearms and ammunition. Although the remains of weapons and munition are basically to be considered archaeological artefacts, weapons are forbidden in the public domain without a special permit77 according to the Weapons and Ammunition Act78 and the Weapons and Ammunition

68 Staatsblad 292 (Bulletin of Acts and Degrees, 292), Article 22.
69 Teters 2013, 26; Bazelmans 2016a, 24.
70 Willems 2007, 54; Teters 2013, 25.
71 Bosman et al. 2014, 17 and 80.
73 Carman 2013, 64; Gundersen et al. 2016, 164
74 Kok and Vos (red.) 2013, 30; Kok et al. 2014, 18–19; Bosman et al. 2014, 46 and 71–72; Lunge 2014, 27.
75 Staatsblad 133: Bulletin of Acts and Degrees, 133.
76 Kok and Vos (red.) 2013, 29; Bosman et al. 2014, 71 and 73; Schiltmans and IJntema 2014, 109.
77 Article 13 of the Weapons and Ammunition Act.
Regulations. In fact, even parts of a rusty rifle barrel or a gunlock are considered weapons, and museums need special permits to display them. Findings like firearms and ammunition are usually considered ‘tactical scrap metal’, which has to be handed over to the authorities and are then destroyed. As demonstrated in chapter 4, archaeologists are sometimes allowed to record some of these findings, but this is obviously not a structural solution.

Although cooperation in any sense is relatively new, UXO/EOD personnel have, on occasion, been guided by archaeologists. During WWII, several German ammunition depots were built in the Netherlands, with one of the largest depots in Western-Europe constructed at Hoog Soeren near Apeldoorn. Since the end of the war, there have been ongoing efforts to clear the forests of ammunition. The municipality of Apeldoorn decided to include all remains of WWII into their archaeological heritage to make the local history more complete. On the one hand, this has meant that archaeological remains of older eras are now recorded during ammunition clearing operations, whereas they would otherwise be destroyed. On the other hand, it has also seen the local remains of WWII included in the archaeological heritage of the municipality of Apeldoorn. In 2010, a construction site in the municipality of Veldhoven (Noord-Brabant) was found to have high archaeological potential. It was located near the airfield of Eindhoven, which was heavily bombed during WWII. Explosives were highly likely to be found and before archaeologists could excavate the site, the area needed to be checked for the presence of ammunition. The activities of the UXO personnel would certainly damage or even completely destroy any archaeological features on the location, so the primary goal of the archaeologists was to minimise disturbance.

---

79 Regeling wapens en munitie.
80 Bosman et al. 2014, 60-61; Schute and Van der Laan 2015, 77.
81 Kok and Vos (red.) 2013, 32; Wijnen et al. 2016, 28.
82 Gemeente Apeldoorn 2015, 32 and 47; Verspay 2010, 5; Van der Weerden and Verspay 2015, 19.
and to record archaeological features and findings. Both parties required some basic knowledge of each other's core tasks. On all occasions, the archaeologists were in the possession of an explosive ordnance disposal certificate, valid for three years, which gave them access to sites were ammunition is located.

Unsurprisingly, archaeological protocols and UXO clearance procedures are not well-synchronised. When explosives are discovered, the local mayor is responsible for their disposal. Since 1998, specialised and certified commercial companies have been entrusted with the detection and collection of dangerous ordnance. The actual demolition of the ammunition is reserved for the Joint Bomb Disposal Squad of the Royal Netherlands Army, Air Force and Navy (Fig. 5.6), the only personnel authorised for this job. A regular UXO clearance process usually starts with a magnetometric survey, followed by an undifferentiated excavation of metal objects. These concentrations of metal objects are torn out of their archaeological context, regardless of whether they are related to WWII or older.

Basically, (unexploded) ammunition is also a source of archaeological information. Therefore, these findings should be recorded and documented before disposal. It can be of great interest to record both the different types of ammunition located at a given site and the distribution of cartridges and artillery fire. This can reveal the exact positions of the opposing forces and the scope of the main combat area, as demonstrated by the study at Little Bighorn. During the recovery of the Junkers 88 near Apeldoorn (2010), all ammunition was recorded before it was destroyed. All ammunition found during archaeological excavations near Arnhem was recorded likewise. As mentioned earlier, Dutch legislations does not make any distinction between modern, active weapons and archaeologically important, rusty, bent and non-active WWII-related (parts of) weapons. Even harmless fragments of shrapnel are not to be recorded archaeologically and are seen as tactical scrap metal. There is still a considerable lack of a national legislative infrastructure to support proper archaeological excavations of WWII-related sites in the Netherlands. This is quite an obstacle for Dutch (conflict) archaeologists, because war is fundamentally about killing and wounding people and, unlike ‘traditional’ archaeologists, conflict archaeologists are almost certain to discover human remains.

Even when archaeologists and UXO personnel do work together during an ammunition clearance or an archaeological excavation, there are further issues to consider. As outlined in article 5.7 of the Heritage Act, archaeological artefacts are to be stored in a depot belonging to the owner of the artefacts: the province, municipality or national government. It is self-evident that unexploded ammunition is not allowed to be stored in an archeological depot, but findings regarded as strategic scrap metal are, typically, not included either. Archaeological depots can request dispensation to store WWII-related weapons, but this is not often granted in practice. Furthermore, most WWII-related findings are still considered ‘bycatch’ and are not structurally handed over to archaeological depots. All artefacts must undergo basic treatment before storage, and seeing as any WWII excavation will likely result in a great many metal objects, they are likely to be pricey. One has to wonder how practical and useful it will be to store all industrially produced material remains of this era. Not all building material, such as bricks, of Roman sites will be collected either. Representative sampling can also be an outcome for WWII-related material (Fig. 5.7).
Dutch archaeological depots are already overcrowded, and it will not be useful to keep every corroded helmet, bent rifle-barrel or spent cartridge.

Last, the most ethically troubling component in practicing conflict archaeology in the Netherlands is the handling of human remains. As discussed in chapter 4, Dutch archaeologists are not allowed to exhume human remains dating from WWII. Archaeologists can easily investigate a medieval cemetery, for instance, but when they stumble across the remains of a WWII victim, all activities have to stop immediately. In the Netherlands, human remains from WWII are exclusively recovered by the Recovery and Identification Unit of the Royal Netherlands Army (BIDKL). Only on very few occasions have archaeologists and the Recovery and Identification Unit worked together. In a moor at Appelbergen, near Haren (Groningen), which is now a nature reserve, 34 individuals were executed in 1943 – a reprisal act for a strike lasting from 29 April to 3 May. After the war, the human remains of nineteen individuals

---


96 BIDKL: Bergings- en Identificatiedienst van de Koninklijke Landmacht.
were recovered. Since 1949, several attempts have been made to find the remaining missing persons. In 2001, archaeologists were contacted in order to locate the graves of these fifteen missing persons. The archaeologists were not allowed to do the actual excavation, but they did identify thirteen possible graves. Eventually no human remains were discovered.  

Forensic archaeology can also shed light on the circumstances of a person’s death. Finally, giving an unknown individual back his or her name is a valuable and unmistakably social act. In other countries, archaeologists have more experience in uncovering human remains of recent conflicts. At the former battlefields of the Ypres Salient in Flanders, for instance, the remains of approximately ten individuals are found each year. In Ypres, two police inspectors are in charge of such finds. After every discovery, they have to check whether it is a crime scene or a victim of WWI. The inspectors write a report and try to establish at the very least the nationality of the individual by means of a button, munition, shoes or belt. The remains are later reburied at the military cemetery nearest to the location where the individual was found.

In the Netherlands, the average number of bodies found every year is approximately the same. An estimated 4,500 individuals killed during WWII are still buried somewhere in unknown graves, including civilians, Allied soldiers and German soldiers. The tasks of the BIDKL is no longer only limited to recovering anonymous so-called emergency burials after a reported discovered grave, but the unit also proactively searches for clandestine burial sites (e.g. liquidations by the resistance) by means of eyewitness reports, uncovering human remains at crash sites of WWII airplanes, and opening the graves of unknown individuals on public cemeteries. It is not permitted to open any grave of an unknown soldier buried at a Commonwealth military cemetery, but sometimes it is possible to positively identify some of these burials by means of the British exhumation reports from 1945–1950. On request of the relatives, circa twenty individuals are exhumed each year from family graves to be reburied at the Dutch military cemeteries located at the Grebbeberg and Loenen. Today, emergency burials are less often reported by amateur metal detectorists, but are more frequently discovered during UXO clearances (Fig. 5.8). Every year the Recovery and Identification Unit processes approximately 40 files, after which some can be closed and some new dossiers can be opened.

Of course, identification is of the utmost importance, since the deceased may still have living relatives with actual living memories of those who died. A positive identification will, in fact, unite two bodies. First, the anonymous remains recovered from a previously unknown grave. This can be regarded as a ‘material object’ with its own history. Second, the body that persisted in the memory of relatives and the local community. For them, this body was never anonymous. However, due to the exclusive claim by the BIDKL, archaeologists are not able to investigate the research potential of such burials. At present, it is not even possible to establish the potential loss of archaeological information. As soon as archaeologists recover the remains of WWII victims, the excavation has to stop and the BIDKL is to be informed revolutionised and has become routine on ancient burial sites. With regard to more modern eras, other (ethical) questions arise, since one is not examining an anonymous, ancient person, but will show an individual blood-relationship to living relatives. This will have a serious impact on the implementation of archeological research. However, since humans remains related to WWII are not to be excavated or investigated by archaeologists in the Netherlands, this technique will not be discussed in this study.

---

97 Kattenberg and Schute 2002, 3 and 10.
100 Van der Schriek and Van der Schriek 2013b, 31; 2014, 232-233; 2016, 5.
101 Schiltmans and IJntema 2014, 103 and 106; Meindertsma 2016.
102 Captain G. Jonker, Senior identification specialist BIDKL, pers. comm.
103 Since 2009, ancient DNA (aDNA) research has been
immediately. Collaboration between archaeologists and the BIDKL, as is often practiced in the United Kingdom and Belgium, is therefore strongly recommended.105 As several excavations abroad have demonstrated, it is possible to recover the casualties and both maximise research potential and identify the individual. But how can disturbing a grave be justified? As explained in chapter 4, the most common thought is to relocate the graves of the missing. However, these excavations often turned out to focus on ‘finding the famous’ instead of ‘finding the fallen’, as with the excavation that led to the recovery of Alain-Fournier (*1886–†1914). Besides, it is not uncommon for them to be funded by the media, as with the major research project on Wilfred Owen (*1893–†1918).106 Human remains of recent conflicts are also discovered during rescue digs, such as during the A19 highway project in Flanders.107 There is, however, a distinct contrast between the remains of WWI and WWII victims. Whereas most WWI casualties are combatants, the overwhelming majority of WWII victims are civilians – a result of an even more developed Total War.108

People who experienced WWII first-hand are passing away rapidly. In a few years’ time, personal testimonies, mémoire, will be completely replaced by histoire. The ethical responsibilities of archaeologists working with human remains are subdivided in three categories: (1) a responsibility towards the scientific

---

105 Wijnen 2010, 30-31; Van der Schriek and Van der Schriek 2013b; 2014, 232-233; Bosman et al. 2014, 35 and 67; Schute and Van der Laan 2015, 77.


107 De Meyer and Pype 2004, 42.

community, (2) a responsibility towards the relatives and their (local) community and (3) a responsibility to the human remains themselves, as belonging to an individual who once lived. The more recent a conflict, the more important the ethics concerning human remains. The largest difference with older eras is the existence of descendants and relatives. Family lore and memory of the deceased should not be underestimated. Human remains of WWI and WWII are too recent to be treated purely as archaeological remains. Excavating them can resurrect painful memories. The value of memory within the field of modern conflict archaeology cannot be denied. In fact, archaeological research on sites of modern conflict itself has a commemorative function, which also leads to several practical and ethical problems. Archaeological research will influence memory narratives.  

It is of the utmost importance that both technical and ethical practice be founded on respect and that suitable archaeological methods are in place and understood. Still, there have been occasions on which archaeologists from one country, working in another, or archaeologists with a different political view than the individuals excavated, treated such remains differently from how they would treat their own dead. Both communities and researchers can be divided along similar lines to those that led to the original conflict, as archaeological excavations related to the Spanish Civil War (1936–1939) have demonstrated. In the Netherlands, when human remains of Allied soldiers are encountered, photographs of the recovery are not often released to the press out of respect for any living family members – in contrast to recovered remains of German soldiers. Research on sites of modern conflict presents a challenging set of legal and ethical issues, prompted by its connection to living memory, often-contested war memory narratives, and its relationship with the media and the general public, as well as with political agendas on several governmental layers.

5.3 THE ‘BURIED PAST OF WAR’ PROJECT

In the Netherlands, conflict archaeology, especially with regard to WWII, is all too often considered an excessively expensive way of researching a history we already know. But what is the actual scientific and societal importance of such research? As long as Dutch legislation on modern conflict archaeology is not adjusted and modernised, archaeologists will continue to play a secondary role when unexploded ammunition, WWII-related weapons or human remains are discovered. Dutch archaeologists are gaining experience in researching WWII but their overall practical skills are limited, simply because of the rarity of WWII-related excavations, of which just over a 100 have been carried out so far (see appendix).

Although not common practice, the first steps have been made towards (improved) cooperation between UXO-clearance companies, the military and archaeologists, as well as modified (archaeological) policy plans. Despite previously made agreements, archaeologists are still forgotten or, at best, not notified of conflict archaeological remains in time, after which they are destroyed without being recorded. Theoretically, traditional archaeological methods and techniques can be used to research sites of modern conflict. Practically, this is often difficult to realise in the field, due to several laws relating to the remains of WWII.
Archaeological remains of WWII conflict sites are often not treated equally to their ancient counterparts in the Netherlands. There is still a general academic disinterest in contemporary and military archaeology. Furthermore, most WWII-related archaeological research was conducted on a micro-level and only contributed to improved knowledge of local history. No research has been carried out on a more macro- or landscape level. A database for all conducted WWII-related archaeological research would be very useful but such a database is not available at present for the Netherlands. When individual research projects are connected, this will contribute much more to our general understanding of the archaeological history of a (far) larger region, even beyond national borders. On the other hand, although those opposed to archaeological research on WWII may be not be convinced of its scientific value, archaeological research to ‘their’ local war history might be of great significance for local communities, making it just as relevant.

Archaeological research on WWII can contribute to the protection, experience and use of the fragile remains of this era. Community interest is of the utmost importance for the preservation of conflict sites, and such sites also have a great potential as tourist attractions. At least some of the remaining WWII-related conflict sites should be investigated and preserved to tell future generations about a darker page in history. Not only can excavations lead to new insights or the development of new techniques for detection, consolidation and preservation of these features, but research can also contribute to wider research agendas on memory and heritage. In the Netherlands, the first academic steps were made in 2011, when the ‘Buried Past of War’ research project was carried out to determine both the potential and the cultural-historical value of archaeological features and findings related to WWII.

With the ‘Buried Past of War’ project (2011), an academic start was made to systematically record features, artefacts, and records of WWII in the Netherlands. The project was a collaboration between the interfaculty research institute for the Heritage and History of Cultural Landscapes and Urban Environment (CLUE) of the Vrije Universiteit Amsterdam and the commercial archaeological company RAAP Archeologisch Adviesbureau. Research was carried out among Dutch archaeologists (commercial archaeological enterprises, provinces, and municipalities) and several archaeological archives were visited. The data located in these archives were as diverse as the amount and method of research of WWII in the Netherlands over the past decades. The main objective of the ‘Buried Past of War’ project was to determine the academic potential and the cultural-historical value of features and cultural material of WWII that was discovered during excavations in the Netherlands. It turned out that, despite their relatively young age, many archaeologists knew very little about these features and findings.

Three main categories of archaeological material can be distinguished on former conflict sites. First, the officially preserved monuments which are usual the main focus of remembrance in a particular region, such
as military cemeteries and preserved trenches on former battlefields. As outlined in chapter 3, this process involves erecting a new landscape of remembrance over the ruins, concealing many traces of this era, causing some stories to virtually disappear from collective memory and the history books. Second, there are features that survived accidentally such as bunkers and other concrete fortifications like the massive Flak towers built from 1940 onwards in the larger cities of Germany and Austria (Fig. 5.9), which are simply too expensive to demolish. These towers served as air-raid shelters for civilians and were used as defence systems by the Luftwaffe against Allied air raids. In the Netherlands, most of the largest bunkers are still present as well but deliberately buried beneath the sand. Last, there are the undiscovered sites beneath the surface with material ranging from earthwork field fortifications to human remains. This range of objects of study sets modern conflict archaeology apart from ‘traditional’ archaeology. These features and findings are exposed to metal detectorists, collectors and destruction by agricultural activities or spatial development.

The principal focus of the ‘Buried Past of War’ project was on the features and artefacts discovered during excavations between the 1980s and 2010. This included chance finds and the more carefully designed and directed excavations of the period from 2000 to 2010. What was the scientific and heritage potential of the archaeological remains linked with WWII? On the basis of this desk-based research and reference to published literature (in Germany, Belgium, France and the United Kingdom), an assessment
was made of these types of sites in the Netherlands. The scientific contribution of conflict archaeology on WWII in the Netherlands as an independent source of information was still unproven, but the importance of these remains as part of the Dutch heritage was beyond debate.\textsuperscript{131} Since the end of the war, over 70 years have passed. The events may be distant in terms of time, but they remain momentous and significant in terms of their memory and resonance in present society.\textsuperscript{132}

During the project it became apparent that there were still large differences in the approach to the archaeology of conflict in general, and WWII in particular, between the various commercial excavation companies, provinces, and municipalities. For instance, the province of Zuid-Holland reported during the survey that they did not accept or register any material or features from WWII, although other provinces and municipalities did record such discoveries, leading to a distorted image of such findings within a region.\textsuperscript{133} However, the available archaeological record demonstrated that WWII-related features and findings had survived in the landscape and below the surface.\textsuperscript{134} These objects and features varied from incidental discoveries of human remains to the professional excavation of the remains of major and complex defensive structures, as described in the previous chapter. Since WWII-related archaeological remains in the Netherlands were usually considered ‘bycatch’, no explicit research questions were for-
mulated either. As such, most of this research was not scientific in nature. A considerable amount of the archaeological data is still either unpublished or remains unsynthesised.

Compared with neighbouring countries, only a few research-focused excavations have been carried out to investigate and reconstruct the wartime activity at any particular conflict site in the Netherlands related to WWII. Before 2000, these finds were seldom recorded in official excavation reports and publications. Despite the paucity of conflict-archaeological research, individual archaeologists took part in research projects out of personal interest or a particular personal commitment to the features and artefacts that they came across during excavations. One of the main important archaeological depots visited was at Arnhem (Fig. 5.10). In this city, both the archaeological community and the local government are interested in features related to WWII, including the famous ‘A Bridge Too Far’ Battle of Arnhem in September 1944, to the extent that an employee has been hired specifically to catalogue this dataset. However, the conservation budgets are insufficient and much of the material is deteriorating in the depot. Furthermore, the interests of the archaeologists are in conflict with those of the UXO removal service and the government, as a result of the Heritage Act. Archaeologists were largely motivated by personal interest, rather than the traditional spheres of development control or grant-funded research. That being said, even when finds and features were recorded systematically, archaeologists sometimes encountered administrative, conservation-related, and legal difficulties in dealing with 20th-century conflict archives.

One of the main conclusions of the project was that the remains of WWII were not only to be regarded as heritage but, indeed, as archaeological heritage, and that WWII heritage could claim a legitimate place within Dutch archaeological heritage management policies. However, many archaeologically important sites have been prematurely destroyed, partially or even entirely, because of building developments, natural erosion and illegal metal detecting, to name just a few causes. Remains must be thoroughly identified and recorded in order to determine which remnants of the war still exist and which should be preserved. It should also be noted that ‘Buried Past of War’ highlighted that much of the available material had been collected with metal detectors, used both by professional archaeologists and amateur metal detectorists. Obviously, many of the artefacts found on a modern conflict site are metal objects. It was apparent that many sites were actually being damaged by metal detectorists and illegal excavations. Various archaeologists feel that some of these amateur metal detectorists are only looking for artefacts for their own private collections or to sell. On the other hand, there are also many metal detectorists who are driven by social concern.

5.4 Metal detecting in the Netherlands

Since its very beginnings, conflict archaeology has been closely associated with the metal detector. This has led to a unique but also complex and sometimes contradictory relationship. The most common instrument used among professional archaeologists during modern conflict research is the metal detector, which locates metal objects, regardless of who is operating it. A metal detector is often the only viable method for

---

137 Cf. Pollard and Banks 2007, iii; Kok and Wijnen 2012, 35; Van der Schriek and Van der Schriek 2014, 230.
138 Bloemers 2010, 3; Kok and Vos (red.) 2013, 11; Bosman et al. 2014, 140; Schute and Van der Laan 2015, 7 and 13; Wijnen et al. 2016, 27.
139 Cf. Sutherland and Holst 2005, 10; cf. Homann and Weise 2009, 27.
140 Kok and Wijnen 2011, 14; Kok and Vos (red.) 2013, 40 and 50; Van der Schriek and Van der Schriek 2013b, 33; 2014, 231; Bosman et al. 2017, 43.
141 Van der Schriek and Van der Schriek 2014, 231; Deal et al. 2015, 12; cf. Wessman et al. 2016, 91.
142 Ferguson 2013; Gundersen et al. 2016, 160.
locating modern conflict sites in an effective manner and a short time span (Fig. 5.11). Like many tools, the metal detector can be used in a constructive or destructive manner. With this device it is possible to trace metal artefacts of the size of a coin (and larger) at up to 30 cm depth, depending on soil conditions. In sandy soils, metal is less well preserved. Metal detectorists can aid in planning, testing and excavation strategies. However, by its very means of operation, the metal detector locates objects regardless of the archaeological context in which they are situated. Without an archaeological methodology underpinning the use of the device, a metal detector can lead to the incorrect assessment of a site's archaeological potential and even damage the site. Thus, best practice would suggest that a metal detection investigation as part of a professional archaeological research project should always be designed and supervised by experienced conflict archaeologists and carried out by experienced detectorists. During a survey in Germany, for instance, an amateur metal detectorist was found on an 1850 battlefield in Schleswig-Holstein. In his pocket, he was carrying a very rare part of a Siemens fuse. He thought this find was unimportant metal waste and would have discarded it. A valuable artefact for understanding the wider context of the battle would thus have been lost if an experienced conflict archaeologist had not recognised it.

In the Netherlands, amateurs are permitted to search with a metal detector on public land. For long, the practice was tolerated, but since 2016, the use of a metal detector has been officially regulated. At the same time, metal detecting is strictly forbidden on registered archaeological sites without permission. On privately owned land that is not marked as an archaeological monument, a metal detector may be used with permission of the landowner. It is forbidden to recover artefacts buried any deeper than 30 cm. Overall, hardly any

Foard 1995; Homann 2013, 210; Kok and Vos (red.) 2013, 40.
Connor and Scott 1998; Sutherland and Holst 2005, 21.
Homann and Weise 2009, 54.
violation of these rules has been prosecuted.\textsuperscript{146} Archaeological artefacts not found during an excavation are regarded as chance finds, which means other regulations apply. According to the Dutch Civil Code,\textsuperscript{147} half of the commercial value of the find is for the discoverer and the other half for the landowner.\textsuperscript{148}

In central Europe, metal detecting became a general problem in the 1980s.\textsuperscript{149} Illegal excavations have also damaged many former sites of conflict in the Netherlands.\textsuperscript{150} In the area around Arnhem, for instance, battlefield tourism and Living History events are attracting more and more interest. A drawback of this increased attention, which may offer advantages in the shape of tourist spend entering the local economy, is that it also attracts more metal detectorists. The exact extent of damage such activities might cause to the potential for future archaeological research is currently unquantifiable, due to the very nature of metal detecting as a hidden activity. It is, however, certain that each year both known and unknown archaeological sites of any era are damaged because of the use of metal detectors. This damage may be significant, but the full extent of the damage can only be fully assessed when controlled archaeological work is undertaken on sites that have already been impacted by unauthorised metal detecting, and these excavations are compared to controls from sites that remain undisturbed.\textsuperscript{151}

Many important artefacts on modern conflict sites are metal objects within the topsoil, vulnerable to any form of erosion. At some sites, artefacts simply rise to the surface due to agriculture or bioturbation and the best of these artefacts can be removed by collectors or casual visitors. Even if an artefact subsequently ends up in a museum, the context of this type of find is often not documented.\textsuperscript{152} Archaeological features can only be consulted intrusively once; afterwards this in situ source of information is destroyed, making it essential to ensure that the context is fully recorded. Professional archaeological research can also be conducted by means of non-invasive techniques, whereas metal detecting is always invasive. In the Netherlands, there is no clear distinction between amateur archaeologists and so-called ‘relic hunters’. The most frequently used tool by amateur archaeologists is the metal detector, and metal detectorists often refer to themselves as ‘archaeologists’.\textsuperscript{153}

Metal detecting, as a hobby, has traditionally been vilified by many archaeologists as an uncontrollable threat to the proper study of the past, due to the perceived threat imposed by the unregulated, unrecorded recovery of objects torn from their context.\textsuperscript{154} For some archaeologists, metal detecting is therefore synonymous with looting, which might be a reason for the under-utilisation of metal detectors by professional archaeologists. Considering the potential damage caused by relic hunters, this reluctance seems entirely understandable.\textsuperscript{155} But, as Natasha Ferguson of the National Museums Scotland (2013) has stated: “It requires striking a balance between recognising the right of those to conduct responsible metal detecting as a hobby and the need to protect battlefields as archaeologically sensitive landscapes.” However, battlefields and other sites related to modern conflict represent an important part of recent history, they are not protected in the same way as other archaeological sites. Unfortunately, conflict-related sites are very popular amongst metal detecting communities.\textsuperscript{156}


\textsuperscript{147}Dutch Civil Code (Burgerlijk Wetboek), Book 5, Article 16.

\textsuperscript{148}Kok and Vos (red.) 2013, 30; Luinge 2014, 28.

\textsuperscript{149}Homann 2013, 214; Hogenbirk 2014, 21; Dobat and Jensen 2016, 70; Lecroere 2016, 183; Makowska et al. 2016, 171.

\textsuperscript{150}Bosman 2006, 34; Wijnen et al. 2016, 26.

\textsuperscript{151}Kok 2006b, 41; Pollard and Banks 2010, 440; Van der Schriek and Van der Schriek 2014, 233 and 237; Gundersen et al. 2016, 164.

\textsuperscript{152}Connor and Scott 1998; Price 2004, 181; Sutherland 2009, 115; Pollard and Banks 2010, 440; Ferguson 2013.

\textsuperscript{153}Van der Schriek and Van der Schriek 2014, 231 and 233; Makowska et al. 2016, 172; cf. Lecroere 2016, 182.

\textsuperscript{154}Thomas 2009, 1-9; Hogenbirk 2014, 33; Gundersen et al. 2016, 163; Lecroere 2016, 191.

\textsuperscript{155}Connor and Scott 1998; Pollard and Banks 2007, xi; Karl 2016, 278; Thomas 2016, 142; Wessman et al. 2016, 85.

\textsuperscript{156}Lecroere 2016, 189; Makowska et al. 2016, 173 and 175; Wessmann et al. 2016, 92.
Metal detecting has grown to be a popular pastime for thousands of people all over the world, some working alone, many working in groups and dozens even participating in organised rallies. In the United Kingdom, for instance, a large detector rally was organised in the newly recognised area of the battlefield of Marston Moor (1644) in 2003. In 2010, a Gallo-Roman villa and a Merovingian grave were destroyed by night by metal detectorists in Northern France. Such a large and inevitably diverse group of people will of course see a range of approaches. Of most concern to archaeologists are those metal detectorists who might be styled as treasure or relic hunters, those who set out to unearth as much material as possible, as fast as possible, and dispose of it into private, unaccountable collections or the antiquities and militaria markets without record. As a consequence, any information that these artefacts could offer is lost. It is not always easy to convince metal detectorists that archaeologists do not look only at the individual artefacts, but also at the context in which they were found.

Outside Western Europe illegal, or uncontrolled, digging is rampant. In Russia, searching for WWII memorabilia is a popular pastime. Since the fall of the Soviet Union in December 1990, it is possible for anybody to search on the former battlefields. Legally, everybody needs permission to search with a metal detector.

---

157 Ferguson 2013; Sutherland and Holst 2005, 17; Lecroere 2016, 187; Makowska et al. 2016, 175.
158 Cf. Kok and Vos (red.) 2013, 53; Van der Schriek and Van der Schriek 2014, 240.
159 Ferguson 2013; Scott and McFeters 2011, 110; Deal et al. 2015, 12; Makowska et al. 2016, 179.
160 Bosman et al. 2014, 86; Van der Schriek and Van der Schriek 2014, 238.
detector, but in practice people rarely request a permit.161 The great expanse of forest, marsh and steppe of Russia west of the Urals is likely too large for the authorities to monitor effectively.162 In Poland, the possession and use of a metal detector is legal,163 as long as the user has a permit.164

In the Baltic countries, the search for WWII artefacts can almost be considered a national hobby. At Narva, Estonia, there are several shops selling various sorts of metal detectors; while many antique shops can be found selling military artefacts nearby. Both inside and outside the local war museum at Sinimäe, ‘Blue Hills’, many artefacts are displayed that were unearthed in the forests and swamps nearby (Fig. 5.12). By looking at this material, visitors can get a good idea of what sort of artefacts can be found on former WWII battlefields in the area. This is material comprised mostly of finds related to ammunition, but also includes sections of tanks and other vehicles.165

On the former Eastern Front (1941–1945) the dangers facing metal detectorists are also easily visible. On the most contaminated battlefields, a simple visual search will reveal large quantities of unexploded ammunition. Meanwhile, the unexploded munitions hidden beneath the surface are uncountable. In many places, unexploded shells can be seen that have been partially excavated. Explosives do not improve with age and unexploded munitions must be assumed to be dangerously unstable. Metal detection and illegal digging on sites of modern conflict and at times the severe dangers which follow are clearly an international problem.166

As in many countries, Dutch law on metal detecting used to be quite complicated. Although the use of a metal detector was tolerated, excavating without a permit was illegal. As soon as a metal detectorist wants to dig up a find, it is classified as an illegal excavation by an ‘amateur archaeologist’.167 In the academic world, amateur archaeologists and metal detectorists are also often conflated, as mentioned before. After the Heritage Act of 2016, laws and legislations were changed and improved. Amateur metal detectorists are now allowed to pursue their hobby as long as they do not dig any deeper than 30 cm (roughly the plough soil) and report every important archaeological finding.168 Both in Norway and Finland, similar legislations apply. However, the (Dutch) Heritage Act does not explicitly include WWII findings.169

Still, at certain particularly sensitive sites metal detection is banned, such as around the cities of Arnhem and Nijmegen, which saw heavy fighting during ‘Operation Market Garden’ in September 1944. However, this ban is primarily related to the ammunition still hidden below the surface, rather than serving as an attempt to conserve the archaeology of these locations,170 as stated in the local municipality regulations (APV).171 In view of growing safety concerns, more and more municipalities are prohibiting metal detecting by amateurs within their borders as a result of the new Heritage Act.172 However, illegal excavations have still not been successfully banned from these areas. For instance, during the archaeological survey in the Oosterbeek Perimeter (2011–2012), several indications for relic hunting activities were found and there is no doubt that artefacts have been taken from the site over the years. The former battlefield of Arnhem also attracts collectors from abroad. In one of the ponds, an illegal British diving team

162 Van der Schriek and Van der Schriek 2014, 238.
165 Van der Schriek and Van der Schriek 2014, 239.
166 Cf. Kok and Vos (red.) 2013, 49; Van der Schriek and Van der Schriek 2014, 239; cf. Lecroere 2016, 189.
168 Heritage Act, Article 2.2 and Article 2.3.
170 Kok and Vos (red.) 2013, 30 and 50; Hogenbirk 2014, 6, 15 and 21; Bosman et al. 2017, 36.
171 Local municipality regulations: Algemene Plaatselijke Verordening (APV). For Arnhem, see: article 2.1.6.13 APV. For Nijmegen, see: article 5.7.2. APV.
even had to be removed from the site. During another official excavation, a recently discovered Dutch helmet (M34) was stolen from the temporary storage at the site.\textsuperscript{173}

In different countries, different rules apply to the search for militaria. In Germany, many historical battlefields have been plundered by illegal metal detectorists.\textsuperscript{174} Recently, the authorities in Flanders determined that metal detectorists can now request a permit to search, even though it was unofficially tolerated for many years.\textsuperscript{175} Nonetheless, the illegal use of metal detectors to search for archaeological objects is far from over in Belgium (Fig. 5.13). Metal detecting is still forbidden in Wallonia, Brussels and the German-speaking region of Belgium.\textsuperscript{176} However, there is a world of difference between picking up a bullet or shrapnel ball from the edge of a ploughed field and specially looking for personal belongings or identity disks buried alongside a dead soldier. Human remains should be treated with respect and dignity at all times when encountered; they should not be disturbed without a good reason. Nationality is relatively easy to establish by means of a shoe, helmet, badge, or button, but one needs identity disks, personal artefacts such as wallets or named articles, or a full forensic study for a certain personal identi-
Unfortunately, German ‘dog tags’ are usually sold and forensic recovery and study is beyond the capabilities and budget of most non-professional groups in the field. Especially on the former Eastern front, many military graves are plundered. For instance, a forgotten German military cemetery of WWII was found at Glubotschka near St. Petersburg in 2006. The site was overgrown by grass and pine trees but it had remained untouched and three large tumuli were clearly visible. The Volksbund Deutsche Kriegsgräberfürsorge was contacted but only visited the site in 2011. By then, the cemetery had been plundered. Approximately 120 soldiers were buried at the site, but the remains of only twenty-one could be exhumed. Only two individuals of this group were positively identified, and the remains of the other 99 soldiers had been scattered across the landscape. Nearly a million German soldiers still rest in unmarked graves on forgotten cemeteries all over the former Soviet Union. Although these practices are mainly restricted to Russia, a quick search on YouTube shows that it also happens in the United Kingdom, France, Germany and the Netherlands. For instance, in 2013 the police arrested a person in Brabant, the Netherlands, who had tried to sell the jawbone of a British soldier alongside some military equipment which he had recently unearthed nearby.

In the Netherlands, while archaeological finds should always be reported, it is recognised that this does not always happen. However, many websites aimed at metal detectorists give clear guidelines and these might be used as an example, such as ‘Detector direct.’ A recurring rule is that all debris should be cleared and tidied and that, overall, one should treat all sites with respect. Unfortunately, on many, if not most, conflict-related sites, illegal digging can be observed. Previously disturbed ground, for instance where trees have been recently cut down, are very popular amongst metal detectorists. Until the 1990s, detectorists also frequently visited construction sites. However, nowadays these sites are much less vulnerable because they are usually subjected to obligatory archaeological investigations through the planning system. As discussed, for a long time there was only a limited academic interest in the archaeological remains of WWII in the Netherlands. However, in recent years awareness has grown in the archaeological community that the heritage of war can be of cultural-historical (or societal) and scientific relevance.

Although simplified, metal detectorists themselves can be broadly classified into two groups: collectors, simply searching for an object to collect or sell, and responsible hobbyist metal detectorists, who are also interested in the story behind an object, although these two groups may overlap. The first group mainly works anonymously and is only ‘visible’ on various websites; the second group does cooperate with professional archaeologists. Used properly, metal detectors can be extremely useful tools in finding objects below the surface, and attempts have been made to bridge the gap between metal detectorists and formal archaeology. A clear difference has to be made between looting and hobbyist artefact hunting. How effective and harmonious this cooperation will turn out to be is often in the hands of the professional archaeologists. Not every experience has to be negative, as several projects have shown.

One example of such work is the efforts of a group of enthusiasts in Northern France led by Philippe Gorczynski, an enthusiastic metal detectorist, who lived in the area of the famous tank battle which took direct 2014.
place near Cambrai in 1917 and who dedicated a number of years to the search for a complete British tank believed to remain buried in the area. Using German aerial reconnaissance photographs taken in 1918, a potential location for a tank was pinpointed and the assessment suggested that the tank was most likely still present. Indeed, in 1998, a British Mark IV ('female') tank was excavated under the management of the archaeological service of Arras, but in close cooperation with the local amateur archaeologists and metal detectorists (Fig. 5.14). This tank was the D.51, which had been named “Deborah” by its crew and put out of action on 20 November 1917. Four of the eight crew members were killed during this action.\(^\text{186}\)

In the United Kingdom, the National Council for Metal Detecting has issued guidelines for its members and many metal detectorists are working closely together with established conflict archaeologists to develop the use of metal detectorists as team members or volunteers. Archaeologists in the United Kingdom have a long tradition of cooperating with metal detecting communities. A successful cooperation between amateurs and professionals was, for instance, established during the Defence of Britain project discussed earlier (1995–2005). Research at Towton (1997) and Bosworth (2010) proved likewise that academics, local authorities and amateur enthusiasts can collaborate in a constructive way. Most conflict-related archaeological projects in Scotland also relied on metal detector groups. At the former battlefield of Culloden (1746), for instance, the exact location of the Jacobite charge on the left flank of the government Army was identified by a metal detector survey. During the field survey at Fromelles (2007), the metal detector demonstrated its practical benefits, though it had not featured frequently on

sites related to WWI until then. Metal detecting has proven itself as a key component in the archaeological research of modern conflict sites.\textsuperscript{187}

There is no reason why the positive plans for collaboration of the kind developed on some conflict-related sites in France and the United Kingdom cannot be initiated in the Netherlands. Cooperation between professional archaeologists and metal detectorists, specialised in WWII artefacts, could be very positive, particularly as many metal detectorists are able to locate and identify certain artefacts much more quickly and effectively than most Dutch archaeologists at present, who, as discussed before, are often not sufficiently trained or experienced in the field.\textsuperscript{188} This leads to the suggestion that a controlled investigation using metal detectors could better be carried out by an experienced hobbyist working under archaeological supervision, than by an unskilled archaeologist.\textsuperscript{189}

Metal detectorists are ironically both visible as well as invisible, both known and unknown. They are ‘seen’ on various websites and they leave physical evidence of their practices in the landscape. However, fundamental information is not available. How many people actively use metal detectors to search for artefacts, how often do they do so, and what do they find?\textsuperscript{190} The Dutch metal detecting community has approximately 10,000 to 15,000 active members, but well-founded statistical data is missing, so these estimations have no valid basis. Often, they are primarily interested in collecting, for instance, the Roman

\textsuperscript{188} Bosman et al. 2014, 17 and 80; Hogenbirk 2014, 30; Kok and Warmerdam 2014, 80; cf. Thomas 2016, 142.
\textsuperscript{189} Sutherland and Holst 2005, 21; Sutherland 2012, 41; Van der Schriek and Van der Schriek 2014, 241; cf. Lewis 2016, 134.
era, medieval times, coins, or indeed WWII. Amongst private metal detectors searching for artefacts of WWII, many believed that this era did not matter much for professional archaeologists due to the limited number of research-directed excavations. Detectorists therefore collected items from such sites without reporting them, since archaeologists did not seem to be bothered. Amongst professional archaeologists, most are outspokenly in favour or against non-professional metal detecting activities. A more nuanced debate seems almost impossible. As long as archaeological remains can be preserved in situ, this should be preferred. On the other hand, amateur archaeologists and the metal detecting community are the eyes and ears of professional archaeologists. Many significant archaeological finds would not have been discovered without the help of metal detectorists and they have brought several objects of high archaeological value to museums. Private metal detecting could be regarded as a form of community participation and a way of embedding archaeology in society, although there can be a thin line between a positive contribution and a negative impact.

During the Westerbork Archaeological Research Project (2011), looting was also ascertained. Several holes were discovered in the former waste dump and some artefacts, mainly made of glass and of low commercial value, were left behind. The research objective at this particular site was to find an indication of what kind of artefacts were likely being removed by metal detectorists. Over the past fifteen years, only one metal detectorist has been caught, after which he returned some of the artefacts that he had removed from the site, in addition to providing vital information about the context of these objects. What sort of artefacts were taken exactly, however, remains unknown. During the excavation, some private individuals offered objects for sale on eBay, which had been illegally excavated at Westerbork. The archaeologists were able to contact two private metal detectorists who searched in the area often and they provided assistance during the project. After the excavations, it first appeared that metal detectorists had relocated their activities to the former NSB-cemetery nearby. However, this effect was only noticeable for a short period of time. Therefore, the management of the National Monument of Westerbork decided to seal the waste dump and to place information panels for visitors. In 2012, the metal detecting community was of great help during the investigation into the remains of a French army camp (1809) in the woodlands near Bussum, Noord-Holland. Several pieces of military equipment, including buttons and bayonets were discovered, as well as several coins (Fig. 5.15). After the metal detecting community reported their findings, an official metal detecting survey was conducted, which was followed by a non-invasive archaeological investigation of the site.

As demonstrated, groups of metal detectorists often did their best to research conflict-related sites as responsibly and ethically as possible, but in previous decades the work has remained fragmented and was not always reliable. Exact location data, historical context and methodical approach can be lacking regardless of who is operating the device. However, it goes beyond the scope of this study to define such terminology.

Deckers et al. 2018, 324.
In fact, a rational discussion is severely hampered by the lack of a more precise terminology. Some people would consider the term ‘metal detecting’, for instance, an example of stereotypical thinking, since it can both refer to treasure hunting or simply the use of a metal detector,
and objects are often sold on collector or militaria markets.\textsuperscript{201} It is clear that some metal detectorists visit the area for their own self-interest, even if others are more engaged with the archaeological process. Of course, treasure hunting is very undesirable, not least because it limits our understanding of the past and commodifies its artefacts. However, this does not mean that the private metal detecting community cannot play any role in a professional excavation. Preventive regulations will not stop people from tearing archaeological artefacts out of context during illegal excavations.\textsuperscript{202} As skilled and responsible volunteers, causing the minimal damage to archaeology, metal detectorists can make their contribution by discovering and recording of previously unknown sites of conflict, for example. It is well known that small metal findings can be easily missed, even during an official archaeological excavation. The motives for hobbyist metal detectorists are much more diverse than just commercial profit. Professional archaeologists and metal detectorists should continue to find common ground in order to work together on a substantial level.\textsuperscript{203}

Many private, uncountable collections do contain scientifically valuable artefacts but are rarely assessed by professional archaeologists.\textsuperscript{204} It can be very interesting to make an inventory of these finds.\textsuperscript{205} In fact, these private finds greatly outnumber the collection of metal artefacts retrieved by professional archaeologists. In order to bridge this gap and to complement the change in legislations, the Portable Antiquities of the Netherlands (PAN) Project started in 2016, following examples set up in the United Kingdom (Portable Antiquities Scheme), Flanders (MEDEA) and Denmark (Danefa).\textsuperscript{206} During this project, an online database will be created which will be made available to scientists, heritage experts and urban planners. The project aims to establish close cooperation between the (Dutch) private metal detector community, the academic world and heritage institutions regarding the registration, scientific enrichment and use of the collections of portable antiquities for decision-making in planning policy. In March 2018, PAN already contained 1,333,575 objects within 853,441 records.\textsuperscript{207} Metal detecting can strengthen the involvement of the public in the archaeological process and its protection. It can be very constructive to highlight the positive contribution of the private metal detecting community. However, it will remain a problematic relationship if legal and ethical issues are ignored.\textsuperscript{208} Professional archaeologists face an important duty: they must make a gesture and reach out to the metal detecting community, rather than vice versa, and attempt to make a friend out of a potential foe.\textsuperscript{209}

\textsuperscript{201} Van Hollebeeke 2012, 20; Van der Schriek and Van der Schriek 2014, 240-241.
\textsuperscript{203} Cf. Dobat and Jensen 2016, 70; Ferguson 2013; 2016, 115 and 122; Thomas 2016, 142 and 145; Lewis 2016, 130 and 134.
\textsuperscript{204} Portable Antiquities of the Netherlands (PAN) 2016. Available at: https://www.portable-antiquities.nl/pan/#/public/about
\textsuperscript{205} Cf. Kok and Warmerdam 2014, 80.
\textsuperscript{206} Deckers \textit{et al.} 2016, 264; Dobat and Jensen 2016, 70; Lewis 2016, 130; cf. Hardy 2017, 2.
\textsuperscript{207} Nederlandse Organisatie voor Wetenschappelijk Onderzoek (NWO) 2016, PAN research project. Available at: https://www.nwo.nl/onderzoek-en-resultaten/onderzoeksprojecten/i/20/26420.html; cf. Deckers \textit{et al.} 2016, 264 and 267; Lewis 2016, 130.
\textsuperscript{208} Gundersen \textit{et al.} 2016, 169.
\textsuperscript{209} Van der Schriek and Van der Schriek 2014, 242; Deckers \textit{et al.} 2016, 267.
Chapter 6 – The application of LiDAR-based DEMs

6.1 Light Detecting and Ranging (LiDAR): Use and Misuse

As discussed in the previous chapter, new building projects and other spatial developments at former conflict sites of WWII in the Netherlands were realised without taking into account the rich archaeological potential and heritage values of these landscapes. Archaeological artefacts can inform us about meaningful differences (ethnic and personal) in the material culture and habits of individuals engaged in war, and, besides their historical value, have both an emotional and memorial value for groups within present-day society as well. On the one hand, the heritage of war is promoted by means of monuments and important anniversaries. At the same time, WWII is largely ignored, since only a few excavations have been conducted on conflict-related sites and many key sites are still not legally protected. Archaeology plays a vital role with regard to the preservation of these fragile sites and relics, as well as in the contemporary experience of such places.

As outlined in chapter 5, it is quite difficult to research WWII archaeologically in the Netherlands, especially since so many research projects solely emphasise on excavations. At an academic level, it is still a pioneering job. Part of the solution for the difficulties conflict archaeologists have to deal with can be the use of non-invasive techniques, such as topographic surveys, aerial photographs, metal detecting surveys, field surveys and documents to map conflict sites of WWII. With these techniques, it is possible to map the availability, condition, (heritage) management and presentation of relics that are still visible on or remain buried under the surface. There is a need for detailed landscape analysis that can be used to identify all sorts of archaeological sites. For 20th-century landscapes of conflict and their surviving archaeological remains, these techniques will bring about a shift from a site-oriented approach towards a landscape approach. By studying landscapes instead of isolated sites or categories of material culture, conflict archaeologists will be able to understand the complexity of militarised landscapes more clearly. Despite the increasing attention for conflict archaeology in general, little research has been conducted into the nature and extent of conflict sites on a macro scale. In order to expand the field of research of conflict archaeology, new analytical techniques have been adopted.

Airborne Laser Scanning, or Light Detecting And Ranging (LiDAR) is a relatively new technique for most archaeologists. However, LiDAR and conflict archaeology are a dynamic and quickly evolving field of research. Digital Elevation Models (DEMs), derived from LiDAR-data, can be very useful to...
map archaeological sites in order to get a better overview of what is left and how these remains should be protected and researched further. LiDAR-based DEMs can be extremely useful to conflict archaeologists, especially in the Netherlands, where the excavation of WWII-related remains is often problematic. DEMs let archaeologists come to an indication of both the archaeological and the heritage value of a conflict site. What are the benefits and drawbacks of applying this technique in the Netherlands? The principal aim of this study is to retrieve, assess and interpret the gathered archaeological information related to WWII. The use of DEMs will improve the prospection, mapping and monitoring of archaeological sites.\footnote{Van der Schriek and Beex 2017, 102.}

The remains of WWII are fragile and under continual threat from erosion, spatial development, (illeg- gal) metal detecting and modern land use. Studying conflict landscapes by means of LiDAR-based DEMs is a specific, non-destructive methodology which can offer new knowledge about modern warfare and provide the means for effective heritage management.\footnote{Stichelbaut 2006, 161; Van den Berghe \textit{et al.} 2018, 1.} LiDAR is a remote sensing technology, based on laser-altimetry measurements made from an aircraft or a helicopter down to the ground. Because the system in the aircraft itself is also moving, it constantly needs to verify its own location with the aid of a Global Positioning System (GPS), in addition to compensating for the inertia of the aircraft (Fig. 6.1). LiDAR produces enormous quantities of very accurate three-dimensional measurements of the surface, thus providing a detailed Digital Elevation Model (DEM) of a landscape. LiDAR does not penetrate the ground, but instead bounces off the first object in its path. Prior to 2000, this technique was largely

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{fig6.1.png}
\caption{Collecting LiDAR data from an aircraft (Author).}
\end{figure}
unknown among the archaeological community.\footnote{13} Ever since the discovery of new features in the rain forest of Guatemala, however, which showed that Mayan cities were far larger than previously believed, there has been a great deal of interest in LiDAR.\footnote{14} The application of LiDAR-based DEMs is particularly useful in forests and heathlands, which can conceal well-preserved landscapes of earthwork field fortifications, military support structures and craters. By studying and mapping these landscapes systematically, they can contribute to wider research agendas; especially those focused on heritage and memory of conflict, but also complementary studies on the environmental impact of combat.\footnote{15}

With the appropriate software, such as \textit{MapInfo} or \textit{Surfer}, it is possible to make highly accurate DEMs of a particular site. The ‘raw data’ show all measured points generated by the laser pulse, including trees, bushes and even people. In short: all the highest points in the landscape (Fig. 6.2). This is called a Digital Surface Model (DSM). The next step involves removing all features above the natural surface, since archaeologists are only interested in the surface level. This creates a Digital Terrain Model (DTM). Still,
a DTM does not show features very well and the image must be adjusted further to highlight elevations. Once this has been done, a Digital Elevation Model (DEM) is produced.\textsuperscript{16}

The resulting DEM can be interpreted visually by using a shaded relief image at different angles of illumination. The visibility of potential archaeological features depends to a large degree on the chosen angles, as linear features, for instance, are not visible if they are aligned with the direction of the light. The visibility and detection of the features often depends on the chosen illumination, a time-consuming but fundamental process for the interpretation of small-scale archaeological features.\textsuperscript{17} Shaded relief images have been proven to be the best solution to detect WWII remains such as trenches and craters. In Surfer, these maps are either displayed in colourscale or greyscale mode, to indicate the local orientation of the surface relative to a user-defined light source direction (the azimuth).\textsuperscript{18} Since all the coordinates of the created DEMs are known, it is possible to project these sites on modern maps or even on Google Earth to precisely locate the detected archaeological features (Fig. 6.3). Harmonising the maps with the Dutch coordinate system allows for swift registration of the detected features. The use of LiDAR-based DEMs has already contributed to the discovery of several new archaeological sites in the Netherlands and abroad.\textsuperscript{19}

In the Netherlands, LiDAR-data is freely available in the original point-data maps from the website of the Actual Height model of the Netherlands (AHN).\textsuperscript{20} The production of the AHN, a detailed DEM of the entire country, is commissioned by the Directorate General for Public Works and Water Management.\textsuperscript{21} The first version, AHN1, was produced from 1996 until 2003. Its successor, AHN2, was

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure6.3.png}
\caption{A Digital Elevation Model (DEM) projected on Google Earth (Author/Google Earth).}
\end{figure}

\textsuperscript{16} Beex 2003; English Heritage 2010, 41; Meylemans and Petermans 2017, 12; Van der Schriek and Beex 2017, 96.
\textsuperscript{17} Hesse 2010, 67-68; Van der Schriek 2016, 10 and 16; Meylemans and Petermans 2017, 23.
\textsuperscript{18} Surfer (version 12) 2014; Meylemans and Petermans 2017, 23.
\textsuperscript{19} Berendsen and Volleberg 2007, 17; Bazelmans 2016b, 11; Beex 2017, 661; Van der Schriek and Beex 2017, 97.
\textsuperscript{20} Actueel Hoogtebestand Nederland.
\textsuperscript{21} Rijkswaterstaat.
made between 2008 and 2013. The flights to collect the LiDAR-data always take place when the least amount of vegetation can be found on the surface, i.e. from 1 December until 31 March. Further minimum requirements are that the surface should not be covered with snow or hail, nor should an area be (partially) flooded. Since laser altimetry does not work on water, data from coastal areas is collected one hour before and one hour after ebb tide to cover as much dry surface as possible. Some areas are restricted, such as military sites and land belonging the royal family. The resolution of such areas is reduced to a maximum of 1 metre. Recently, the Flemish Government also released LiDAR-data covering Flanders and Brussels, DTM-Flanders II 2013-2015.

The resolution of the collected LiDAR-data in the Netherlands has increased significantly over the last decade. The first version, AHN1, provided DEMs with a resolution of one measuring point every sixteen square metres. Its successor, AHN2, offers DEMs with an average of six to ten measuring points per square metre. Since 2015, data has been collected for AHN3, which is expected to be completed by the end of 2019. Although this will be the newest version, the resolution has not been improved. The main reason to collect new data is to see whether phenomena such as erosion have caused any significant landscape changes. Since AHN3 was not available for the sites discussed in this chapter, AHN2 data was used. Although the accuracy of a modern LiDAR-system has to be appreciated, it will never be fully perfect. The accuracy increases with the number of measured points, but errors may still occur due to stochastic measurements, the flightpath of the aircraft (location, flight angle and altitude), the type of soil and vegetation on the ground.

There are simply too many variables, which is why all professional companies and institutions that create LiDAR-data will always specify their minimum level of accuracy. Two kinds of errors can influence the data. First, there are systematic errors, which are caused by the technique used. This issue can be compared with the situation of bullets hitting a target at the same spot, whilst not exactly hitting the bullseye. The second type of errors is called stochastic (or standard) errors. Using the same example with bullets around a bulls’ eye, the stochastic error will show the spread of the impacts in and around the target. However, the general accuracy of most modern LiDAR-systems is amazingly good.

DEM’s are best made of forests and heathlands, landscapes which have remained ‘historically stable’ and are usually the sort of sites where no development-funded archaeological research is conducted. Traditional survey methods such as field-walking are ill-suited to such areas and aerial photographs and remote sensing cannot detect features below the canopy. In France, a promising study was conducted at the Bois des Caures, which is where the Battle of Verdun (21 February–18 December 1916) started. The forest now contains a micro-topography of the battle, since the site is studded with trenches, craters, ammunition depots, narrow railway gauges and artillery platforms. The surface is covered with vegetation, greatly complicating a regular field survey. Therefore, the site was examined with LiDAR: the data was collected during the winter of 2006–2007 with an average accuracy of up to 16 measuring points per square metre, where flightpaths crossed. Such a survey had never been conducted in France before. As an important (inter)national lieu de mémoire, the study’s main aims were to map the archeological remains of the battle and to determine the current state of these features in order to protect them better. However, although LiDAR-data offers new possibilities for surveying forested environments, it is a...
misleading statement that LiDAR can ‘see through trees.’\textsuperscript{29} It works by filling in missing values with the nearest real measurement; these missing values come about when the tree canopy is too dense to allow measurements. Consequently, the larger the gap of missing values, the more inaccurate the interpolated areas are on the DEM. Fortunately, in the Netherlands, even in the most densely forested areas the canopies provided just enough gaps to get a reasonable set of points.\textsuperscript{30}

Obviously, archaeological features detected on DEMs are not restricted to one era. The collected data will present a wide chronological range. Elevations and features from all times can be discovered.\textsuperscript{31} All in all, three sorts of vital information can potentially be derived from these images, namely (1) natural and topographical phenomena, (2) structures and relicts related to WWII and of course (3), ‘traditional’ archaeological sites and (pre)historic features in the landscape.\textsuperscript{32} Bronze- and Iron-Age Celtic fields (prehistoric field systems), for instance, are often encountered. They can be recognised by their rectangular field plots measuring about 20 to 40 metres and surrounded by bank structures.\textsuperscript{33} Even more recent eras, however, like the Cold War (1947–1991) have also left archaeological traces in the landscape (Fig. 6.4).\textsuperscript{34}

It is notable that in some areas, sites were (re)used for military purposes in different eras. The woodlands near the town of Bussum have the status of a regional forest and are used for recreation. On the DEM several structures can be detected (Fig. 6.5). The bunkers date back to WWI and were part of the New Holland Waterline,\textsuperscript{35} a Dutch line of defence used between 1815 and 1940. Between 1915 and 1918, the Dutch Army constructed 22 smaller bunkers (Type I) and 13 large bunkers (Type II) interconnected with trenches. The other structures are older remains of cooking pits of a French army camp of Louis Napoléon Bonaparte (*1778–†1846). By means of historical sources and several metal detecting finds (see also chapter 5.4), this camp was precisely dated to May–July 1809, the year of The War of the Fifth Coalition, an alliance between the Austrian Empire and the United Kingdom against Napoléon’s

\textsuperscript{29} English Heritage 2010, 5; Meylemans \textit{et al.} 2015, 1.
\textsuperscript{30} Van Heerd \textit{et al.} 2000, 8; Van der Zon 2013, 12; Van der Schriek and Beex 2017, 99.
\textsuperscript{31} English Heritage 2010, 5; Meylemans and Petermans 2017, 46; Geyhle \textit{et al.} 2018, 56.
\textsuperscript{32} Stichelbaut 2006; Van der Schriek 2016, 9.
\textsuperscript{33} Cf. Creemers \textit{et al.} 2011; Meylemans \textit{et al.} 2015, 1.
\textsuperscript{34} Van der Schriek and Beex 2017, 100.
\textsuperscript{35} Nieuwe Hollandse Waterlinie.
French Empire and Bavaria. In order to stop a possible British invasion, Napoléon needed a force of a significant size, i.e. 4,000 troops, at a strategic location in the Netherlands. The area had already been of military importance during the Franco-Dutch War (1672–1678) and during the sieges of Naarden in 1787 and again from 1813 to 1814.36

In order to make in-depth use LiDAR-data, the ‘raw data’ has to be classified into useful and meaningful groups. This is usually done semi-automatically, requiring analysts with expert knowledge. The differentiation is based for a large part on the light intensity of the reflections. In a landscape, the differences in light intensity will show the deviations between buildings, trees, shrubs, and the actual surface in a point-cloud. With the improvement of differentiation techniques and better software algorithms, most providers are now able to present their data with a list of classification codes. Usually this is the so-called

36 Bazelmans 2016b, 11-16.
LAS-classification, defined by the American Society for Photogrammetry and Remote Sensing (ASPRS). Categories often include surface, vegetation (low, medium and high), buildings, water, and miscellaneous. However, this can vary from country to country and from organisation to organisation. It is important to remember that LiDAR classifications are never fully perfect, since it is a semi-automatic process.37

The original AHN2 point cloud was used for the creation of the DEMs in this study. This point cloud is available for download in two separate parts. As the information was originally intended for water management, only a differentiation between surface data and other data was required. For most archaeological research, this differentiation is also sufficient. The first file contains all the actual surface points and the second file includes all reflection points from buildings, vegetation and other objects. For the WWII-related features we were looking for, only the surface points were needed. However, this means that some man-made structures, such as ruins and bunkers, cannot be easily separated from the data, and this division is never fully accurate. Except for open water, the files with the surface points contain an average of eight observations per square metre. According to basic sampling strategies, this allows for a grid of 0.5 by 0.5 metres. The data can be downloaded in units starting at 6.25 km x 5 km.38

Point clouds are transformed into a DEM by gridding the data. This means that a grid file is made using the individual measurements, which can be visualised as a two-dimensional map or a three-dimensional mesh. For each desired surface, a grid is generated by the computer, based on mapping the existing data points exactly on the grid points, or in the vicinity of those grid points. For this process, several mathematical algorithms are available. These algorithms determine the significance of each individual data point, and the area around a grid node in which points are used for the calculations. This also means that each result will be a different representation of the original information.39

If no prior knowledge of the terrain and its features can be obtained, it is highly recommended to use a generic algorithm with standard options. In most cases, however, researchers will have a reasonable idea of the size and the shape of the possible features in the landscape. This information can be used to insert specific variables into the equation, which will prompt the algorithm to prioritise objects of this size and shape, so that the resulting grid file will enhance all possible features. One aspect of this can be regulated with anisotropy, which can best be explained with the example of a manmade trench. Within the trench, many data points will have almost the same height value, but perpendicular to the trench, data points may have quite different height values, though they are just a short distance away. This knowledge can be incorporated into the algorithm, so this phenomenon will show more clearly on the created surface model. There is a drawback to such enhancement procedures, though: if they are overused, the algorithms may exaggerate the presence of features. In that case, the grid file will, in fact, show more than exists in reality. Therefore, this method should only be used if a proper understanding of both the landscape and the archaeological structures is available.40

With regard to specifications, 0.5 by 0.5 metres is the highest grid density allowed for the AHN2, which means that features larger than 1 by 1 metre can be detected. The different algorithms, however, do not have an automatic failsafe for this value. As a result, there is no technical density limit, except perhaps for computer memory. The maximum guaranteed density of measured points, however, does determine the minimum size of detectable features. Non-experienced users have been known to increase the density to get a better-looking image. However, this is scientifically unacceptable. First of all, such a grid file would suggest a far better scanning resolution than was actually used. Any future research might then be based on phantom features that are pure processing artefacts. Secondly, the algorithms will always try to fill the gaps of the missing values, which will, of course, be abundant if the grid is far denser than the

37 Beex 2017, 663; Van der Schriek and Beex 2017, 100.
38 Cf. Van Heerd et al. 2000, 6, 8 and 13; cf. Van der Zon 2013, 18 and 30; Van der Schriek and Beex 2017, 100-101.
40 Van der Schriek and Beex 2017, 101.
available LiDAR point cloud. This process will result in strange mathematical artefacts in the grid file, suggesting non-existing features on an incorrectly shaped surface. 41


There are two algorithms that are most suitable for processing LiDAR data. For situations with limited knowledge about either the correct variables or the environment, Triangulation with Linear Interpolation is the best solution. 42 This method will use the original data as much as possible but may create a facetted surface. It does not support any options for smoothing. An advantage is very fast calculation speeds. If more knowledge is available, as for instance with the AHN2 and some very specific archaeological remains of WWII, Kriging, as available in the Surfer application developed by Golden Software, is probably the best algorithm to use. 43 This method is ideal for irregularly spaced data, such as surface points. Kriging is named after South-African mining engineer Danie Gerhardus Krige (*1919–†2013) and this algorithm is very useful for detecting trends suggested by the data. The AHN2 can be used for a wide range of scientific applications, of which archaeology is just one. 44 With regard to the features of WWII, the main research goals of the use of LiDAR-based DEMs are to (1) investigate the extent of militarised landscapes in the Netherlands, (2) map the geographical distribution of the detected features, (3) examine the degree of preservation, (4) determine differences between Allied and German features and (5) explore how conflict landscapes of different eras overlap, 45 as was the case at Bussum.

Like any other archaeological tool, LiDAR-data have their strengths and weaknesses. Their effectiveness depends largely on the user's ability to interpret the data efficiently. Before a DEM is created, the LiDAR data are processed on many levels, during which useful information can accidentally be removed, thus producing misleading data. The original point data is as important as the final DEM, since missing
values can make features on the surface disappear.\textsuperscript{46} With the \textit{Voxler} application developed by Golden Software, both the surface data and the other points can easily be visualised. These 3D-representations of the data clearly show if, where, and in what quantity the LiDAR-scan was unable to reach the surface (Fig. 6.6). As expected, areas with coniferous trees are primarily affected. The surface points, depicted by the yellow dots, are clearly not uniformly distributed. The canopy, shown by the green dots, obstructed the laser in many places. Still, it was determined that even those sites contained enough measurements for the identification of larger features, such as trenches and the remains of munition bunkers. Only smaller structures, such as foxholes, could have been missed because of those missing values. However, an untrained observer of a fully processed visualisation based on LiDAR-data may get the impression that a specific area has been disturbed. Therefore, knowledge of the actual point cloud will help avoiding such misinterpretations.\textsuperscript{47}

LiDAR data should always be checked and validated before any further analysis is conducted. Which classification has been used? Are there any gaps in the data? What is the density of the measured points in contrast to the size of the detected features? Furthermore, the collected and interpreted data should also be checked at the location itself, since they can only show a potential archaeological site. Although DEMs are usually not difficult to create, they often tend to be just ‘nice images’, instead of a truly scientific basis for (further) research.\textsuperscript{48} DEMs have emerged as a valuable new data source for the prospection, mapping and monitoring of archaeological sites, but they do not make other techniques unnecessary.\textsuperscript{49} LiDAR data can be used as a complementary approach to geophysical prospection and image warping, for instance. The analyses of DEMs can provide complementary information. Each technique can provide valuable and unique information which cannot be replicated by other analysis methods. When combined, they lead to an interdisciplinary study on the heritage of WWII, providing broad knowledge of a particular area. The impact of this new technology is especially important for understanding the size and complexity of militarised landscapes of recent conflicts.\textsuperscript{50}

### 6.2 Landscapes of Conflict – battlefields and defence works

As discussed, landscapes of memory are of great significance to our present-day world. Wars are etched into the memories of nations, communities and individuals. What people remember, and how, changes with time, especially now historic events are disappearing in living memory.\textsuperscript{51} Now the last generations of both WWI and WWII are passing away, the importance of archaeology and the landscape itself as ‘final witness’ is growing rapidly. Twentieth-century conflict sites are attracting increasing interest from archaeologists, the heritage sector, geoscientists and the general public.\textsuperscript{52} WWII sites should be considered landscapes of conflict in the widest sense. In Western Europe, conflict archaeology is primarily focused on concrete (or hardened) fortifications, such as the Atlantic Wall. However, these structures only form a relatively small part of a militarised landscape.\textsuperscript{53} The extent of both the present surface remains, as well as the archaeological heritage, is widely underestimated. Current heritage management with regard to sites

\textsuperscript{46} English Heritage 2010, 6, 14 and 17.  
\textsuperscript{47} Beex 2017, 662; Van der Schriek and Beex 2017, 102.  
\textsuperscript{48} Beex 2003; 2017, 668; Van der Schriek 2016, 16; Van der Schriek and Beex 2017, 102.  
\textsuperscript{49} English Heritage 2010, 5; Bazelmans 2016b, 11; Van der Schriek 2016, 17.  
\textsuperscript{50} Cf. Carman 2013, 71; Meylens and Petermans 2017, 56; Van den Berghe \textit{et al.} 2018, 1 and 14; Geyhle \textit{et al.} 2018, 56.  
\textsuperscript{51} Van der Schriek 2019.  
\textsuperscript{52} Pollard and Banks 2007, iv; Passmore and Harrison 2008, 87; Passmore \textit{et al.} 2014, 1276; Stichelbaut \textit{et al.} 2017, 235.  
\textsuperscript{53} Passmore \textit{et al.} 2014, 1275; Van der Schriek 2016, 3; Van der Schriek and Beex 2017, 103.
of conflict is usually focused on architectural heritage, monuments and military cemeteries, as discussed in the former chapter. A conflict landscape is usually not recognised in its entirety.\textsuperscript{54}

After WWI, many former battlefields in France were considered too damaged for reuse and impossible to clean. These are currently the \textit{Zones Rouges}, the Red Zones, with restrictions for habitation, agricultural land-use and forestry. Consequently, features of WWI have been preserved extremely well. In contrast, in the Netherlands and Flanders, the landscape was restored relatively quickly, erasing most of the features of both WWI and WWII.\textsuperscript{55} In general, it can be stated that WWII conflict sites have been widely investigated in urban locations and landscapes with regard to heritage, memory and commemoration, especially those focused on the civilian experience of modern warfare. In contrast, much less attention has been paid to conflict sites in non-urban landscapes, not least because the mainly non-hardened features there have rarely survived post-war landscape restoration. Earthwork field fortifications, military support structures and craters can often be detected in forest and heathlands, both on the former frontline as well as behind the lines, for instance in the Ardennes.\textsuperscript{56}

Earthwork (or non-hardened) field fortifications can be classified into two types of sites: (1) ground combat sites and (2) logistical sites. A pilot study was conducted on a former WWII battlefield in the Ardennes. The area of Sankt Vith–Schönberg, Belgium, belonged to Germany until the end of WWI and is still inhabited by a German speaking community. In 2007, an important field survey was conducted by the British archaeologists David Passmore and Stephan Harrison at two locations in the area. Both locations are near the present German border with its remainders of the Westwall, as well as at the heart of the Battle of the Bulge (16 December 1944–25 January 1945).\textsuperscript{57}

The main objective of this field survey was to localise the physical remains of WWII-related features. The first area was located at the Prümer Berg near Sankt Vith. This field survey was the first of its kind and was conducted in an area of 1.4 square kilometres. The main features were subdivided into three categories, based on the U.S. Army Field Manual 5-15\textsuperscript{58} on field fortifications: (1) larger structures, mainly for artillery purposes, (2) rectangular structures, mainly foxholes, and (3) round structures, mainly craters. At the first locations, a total of 105 WWII-related features were encountered. All categories were present, but the largest, rectangular structures were most often discovered. Here, at the Prümer Berg, the forest was still intact.\textsuperscript{59}

The situation at the second location at Lindscheid near Schönberg clearly demonstrated the danger of deforestation. In the researched area, only eleven WWII-related features were discovered, of which four were identified as foxholes. Not a single crater was encountered. The sites of Sankt Vith and Schönberg provided unique and detailed insight into troop movements and the outcome of battle. In undisturbed forested areas, as exist in the border regions of Belgium, Luxemburg and Germany, such features can still be detected. Deforestation, however, is a great threat for these earthwork field fortifications. In contrast to static, concrete field fortifications, these features give an insight into mobile warfare. Such structures are small and only suitable for temporary usage.\textsuperscript{60}

The mobile character of WWII in Europe rarely permitted the development of extensive bunker and trench networks. In mid-1917, military doctrine changed. Uninterrupted trench lines were replaced by short stretches of trenches or strongholds in craters, and during WWII, battlefields were covered with temporary foxholes and gun emplacements.\textsuperscript{61} Such features have gained relatively little attention from

\textsuperscript{54} Cf. Geyhle \textit{et al.} 2018, 55.  
\textsuperscript{55} Cf. Gehyle \textit{et al.} 2018, 55.  
\textsuperscript{56} Passmore and Harrison 2008, 88; Passmore \textit{et al.} 2013, 165–166; 2014, 1276 and 1288; Capps-Tunwell \textit{et al.} 2015, 235 and 258; Van der Schriek 2016, 3; Geyhle \textit{et al.} 2018, 55.  
\textsuperscript{57} Passmore and Harrison 2008, 88; Passmore \textit{et al.} 2014, 1277.  
\textsuperscript{58} U.S. Army 1944.  
\textsuperscript{60} Whiting 1995, 249–250; Passmore and Harrison 2008, 88 and 99.  
\textsuperscript{61} Passmore and Harrison 2008, 88; Stichelbaut \textit{et al.} 2017, 243.
the archaeological or heritage community, since these small, non-hardened field fortifications are usually rendered invisible due to post-war developments. However, earthwork field fortifications do make up, in combination with craters, most of the immediate legacy of modern conflict.62

Near the village of Wolfheze, similar structures to those at Schönberg can be discovered in the forest. As explained earlier, LiDAR-based DEMs do not always show all features on the ground due to overly dense vegetation or data errors. Heavy fighting took place near Wolfheze during the Battle of Arnhem, and Allied airborne units landed all over the area. On 19 September 1944, Brigadier John Hackett (*1910–†1997), commander of the British 4th Parachute Brigade, ordered his men to dig foxholes to set up his Headquarters. In 2004, these foxholes were deepened for the public (Fig. 6.7).63 On a DEM of the region, these defence structures can, in fact, be detected (Fig. 6.8), if you know exactly where to look. The remains of some German positions can also be located in the area, though they have received much less attention.64 Next to the A50 motorway, more foxholes should be visible in the forest. The features to the far left, on either side of the A50 motorway, are in a location that historical sources describe as having been held by German troops.65 On the DEM, however, they are very hard to localise. Most of the literature describes the British positions, rather than German remains, and none provide any maps. Therefore, a careful field survey was needed to authenticate them.66

Fig. 6.7. Re-excavated foxholes of the British 4th Parachute Brigade near Wolfheze (Author).

62 Passmore and Harrison 2008, 88; Passmore et al. 2013, 166; 2014, 1276; Capps-Tunwell et al. 2015, 235 and 258.
63 TracesofWar 2002a.
64 A field survey was conducted in this area on 19 May 2017.
65 Pers. comm. David Passmore and David Capps-Tunwell.
66 Van der Schriek and Beex 2017, 107.
On the eastern side of the A50 motorway, at least five well-preserved German slit trenches are still visible in the forest (Fig. 6.9). These trenches were dug in more or less a straight line next to each other, approximately 4 to 5 metres apart. Since they are well ordered, it can be concluded that this line of defence was prepared in advance. Experience has shown that 4 to 5 metres of separation between the slit trenches is consistent with what has been found in Normandy, France. On the western side of the motorway, some other German foxholes can be discovered. These appear to have been dug much more hastily and were not constructed according to German regulations, suggesting they were built under battle conditions. In contrast to the British foxholes, no information on the structures is available on the spot. The re-excavated British foxholes are approximately 30 to 40 centimetres deep; their German counterparts had an unexcavated depth range of 20 to 30 centimetres. Illegal metal detecting had taken place in the area as well, but the deforestation that had occurred on both sides of the road was of greater concern.

As illustrated by the examples of Schönberg, mechanised felling operations destroyed most of the battlefield remains at Prümer Berg. Before these features are permanently lost due to further disturbance, there is an urgent need to establish the scale and character of this recent archaeological resource and to develop a framework for future heritage management. The slit-trenches and foxholes of Wolfheze are a perfect example of the hurried construction of field fortifications in the face of an unexpected and imminent threat. As outlined in the previous chapter, the extent of a threat is often an essential factor...
in setting priorities with respect to conservation and excavation.\textsuperscript{69} It is highly recommended that the remaining features on the battlefield near Wölfehe are recorded and mapped to stimulate a wider awareness of the value of such remains.

Another good example of some German non-hardened field fortifications can be found in the forests near Herkenbosch-Rothenbach at the present-day border with Germany. After the Battle of Arnhem (17–25 September 1944), German Supreme Command\textsuperscript{70} realised that the Ruhr region, an important industrial area, had to be better protected. As a final stronghold to protect the Ruhr region and northwest Germany, these defence works were constructed quite hastily.\textsuperscript{71} After Market Garden, the northern and central parts of the province of Limburg were isolated from the rest of the Netherlands. As early as 30 August 1944, Hitler ordered the extension and reinforcement of the Westwall. The area east of the river Meuse was formally incorporated into Germany.\textsuperscript{72}

This new defence line was made by prisoners of war, forced (Dutch civilian) labourers and regular German troops. This defence line was officially named the Maas-Rur-Stelhang-Elmpter-Wald-Stellung, and stretched over 40 kilometres from Venlo in the Netherlands to Wassenberg in Germany. The regional party leaders of Essen and Düsseldorf were responsible for the work. All male inhabitants between the ages of 16 and 60 were forced to work on the construction of the new defence line.\textsuperscript{73} The trench system near Herkenbosch-Rothenbach was built under the command of the Festungs-Pionierstab 27, which was led by

\textsuperscript{69} Deeben \textit{et al.} 1999, 192.  
\textsuperscript{70} Oberkommando der Wehrmacht (OKW).  
\textsuperscript{71} Beckers 2012, 6.  
\textsuperscript{72} Grüter 2017, 201.  
\textsuperscript{73} Grüter 2017, 201.  
\textsuperscript{74} German equivalent of a Colonel.
Oberst74 Michelmann. Dozens of bunkers were constructed, made of both concrete and wood, interconnected by trenches and protected in several spots by tank traps. The defence line consisted of some advanced positions, several combat outposts, a main battle line, reserves and artillery positions.75 However, it was never fully completed.

On the 2 December 1944, Allied troops had reached the Meuse in Limburg. The German troops withdrew on the east bank of the river. Soon, the evacuation of the civilians was planned. Due to the initial successful German offensive in the Ardennes (16 December 1944–25 January 1945), the evacuation was postponed. In January 1945 the British Army started an offensive to capture the bridgehead near Echt, after which the evacuation was finally initiated on 14 January. The Dutch population was evacuated via Germany and entered the Netherlands again between Overijssel and Gelderland. About 5% to 10% of the population of Limburg stayed behind.76

During the winter months, fighter-bombers attacked the German positions in the Herkenbosch-Rothenbach area on several occasions.77 According to historical sources, US troops of the 134th Infantry Regiment78 entered the area on 28 February 1945. Due to the Allied ‘Operation Grenade’ (8 Febru-

---

74 Selten 2006; Rottman 2008, 6; Beckers 2012, 12 and 22.
75 Grüter 2017, 201, 203 and 205-206.
ary–11 March 1945), the German defence line was quickly crossed in the south, which forced German troops to abandon their positions in this sector as well by 1 March.\textsuperscript{79} According to oral history, several young, fanatic \textit{Fallschirmjäger}\textsuperscript{80} did put up quite a fight in the area. Indeed, some sectors were defended by German airborne troops as well as by soldiers from the 176th Infantry Division and the XII SS.\textsuperscript{81} Official historic sources do not mention any fighting in this specific sector. However, how are battlefields defined exactly?\textsuperscript{82} There is archaeological evidence for combat in the region in the form of craters (as indicated by DEMs of the area), shell fragments, and cartridges.

The \textit{Maas-Rur-Steilhang-Elmpter-Wald-Stellung} is a unique WWII defence line in the Netherlands. Clearly visible on the DEM (Fig. 6.10) are the trenches of the main battle line. German trenches have a very distinctive, zigzagging pattern,\textsuperscript{83} and many trenches are still very clearly visible in the forest (Fig. 6.11). During a field survey,\textsuperscript{84} the unexcavated depth range of most of these trenches was approximately 70 centimetres, compared to a width of about 50 to 60 centimetres. Other highly distinctive features in the landscape and on the DEM include tank traps. Tank traps are easily recognised and used to be 3.5 metres deep and 2.5 metres wide.\textsuperscript{85} Now, these features have an average depth of 1.5 to 2 metres, but they

\begin{itemize}
  \item This regiment was part of the 35th Infantry Division (Santa Fe), XVI US Corps, Ninth Army.
  \item Selmann 2006.
  \item Airborne troops.
  \item Selmann 2006; Beckers 2012, 16.
  \item Van der Schriek and Beex 2017, 103.
  \item Rottman 2008, 8.
  \item This field survey was conducted on 20 May 2017.
  \item Van der Schriek and Beex 2017, 103.
  \item However, one of these features cannot be labelled a tank trap without discussion (marked on Figure 6.10 as ‘Unknown’). First, its position is not in line with the
\end{itemize}
are still 2 to 2.5 metres wide.\textsuperscript{86}

On the DEM, several craters can be clearly recognised. As expected, most craters are centered around the railway in order to obstruct any transportation of troops, equipment and ammunition. Other concentrations of craters are next to the remains of earthwork bunkers, suggesting some sort of resistance at these spots. This railway was known as the ‘Iron Rhine’, which connected the port of Antwerp in Belgium with Mönchengladbach in the important (industrial) Ruhr area in Germany. Its construction trenches and the tank traps in the east. Second, this is the only feature which is indicated on maps of the region as of 1958. Before that year, the unknown feature was never mapped. As of 1958, it appears on maps, but genuine tank traps are never included, suggesting a post-war construction. See Topotijdreis: 200 jaar topografie. Available at: http://www.topotijdreis.nl/

Fig. 6.12. Comparative crater sizes for selected bomb types and fuses. Illustrated craters are for 100lb GP bombs in clay soils (Redrawn after Capps-Tunwell et al. 2016a, 316. Based on an original IX Bombardment Division document, AFHRA IRIS Ref. B5755, Operational Research Section).
was completed in 1879. Both field surveys and LiDAR-based evaluations already have demonstrated that many wood- and heathlands conceal considerable numbers of craters. During a pilot study in Normandy, France, the relationship between crater size and the type of ordnance, fusing, drop height and ground conditions was assessed. But what created these craters – artillery or airstrikes?

As depicted in Figure 6.12, bombs with instantaneous nose fuses have little or no cratering effect. In order to maximise the blast and fragmentation effect, these bombs immediately detonate when they hit the surface. Such bombs were mainly used against troop concentrations, rolling stock and lightly-armoured vehicles. Cratering was desired against structures, railways and roads, in which case a delayed nose fuse of 0.01 or 0.025 seconds was typically applied. Many craters at Herkenbosch-Rothenbach have an average diameter of 5 to 6 metres (Fig. 6.13). Such craters would be at the top end of medium-heavy artillery (c.150 mm plus), and therefore cannot be ruled out. However, given the lack of combat in the area, and the fact that the scatters do not indicate a serious artillery strike, airstrikes are much more likely. For the type of bomb, there are several possibilities depending specifically on the type of nose fuse used. The sizes of the craters in the region match those for 1000-2000lb bombs if fused for instantaneous detonation, but 500lb bombs are also possible, given the soft soil in the area. Most parts of the soil consist of loess. If the bombs were fitted with delayed fuses, they are most likely to have been 100lb bombs. For

---

Capps-Tunwell et al. 2016a, 313.

Capps-Tunwell et al. 2016a, 315.
General-purpose (GP) bombs use a thick-walled metal casing with explosive filler. These bombs are a common weapon for fighter-bombers because they are useful for a variety of tactical applications and relatively cheap to produce. However, some discovered artefacts do suggest the use of artillery, including an unexploded 17-pounder shell, used both for artillery and the Sherman Firefly, a version of the US M4 Sherman tank.

The archaeological record of projectile craters has not often been thoroughly analysed. For the Netherlands, the study presented here is the first of its kind. Many of the available techniques are conducted on fresh, undisturbed impact zones. However, the analysis of bomb craters in Normandy, France, did demonstrate that crater sizes provided a useful framework for interpreting the sort of bombs used and accommodated the application of variables such as soil type, drop height and fusing. Nonetheless, researchers looking to correlate bomb sizes with crater sizes must proceed with caution. Bombed sites can be studied most effectively when researchers consult the archive records of specific air raids. Shell fragments themselves are the most common artefacts found on a battleground of modern conflict. These pieces can, in fact, reveal some information on the type, caliber, the nationality of the shell, what factory and when the shell was produced, if it was fired and roughly from what distance. Main components are the body, fuse and either the rotating band (artillery shells) or tail-fin assembly (mortars and bombs). Fragments of the body are the least useful for determination.

At several places, activities of illegal metal detecting could be observed, including next to earthwork bunkers. Concrete bunkers (known as ‘Tobruks’) were built in the advanced positions and are not

---

89 General-purpose (GP) bombs use a thick-walled metal casing with explosive filler. These bombs are a common weapon for fighter-bombers because they are useful for a variety of tactical applications and relatively cheap to produce.

90 Pers. comm. David Pasmore and David Capps-Tunwell.

91 Beckers 2012, 40.

92 I.e. the Ordnance Quick-Firing (QF) 17-pounder.

93 Capps-Tunwell et al. 2016a, 325 and 327.

included on the DEM presented here. Furthermore, the algorithms classified these structures as buildings, which is why they were filtered out. Most bunkers of the *Maas-Rur-Steilhang-Elmpter-Wald-Stellung* were non-hardened earthwork field fortifications. According to the German Army regulations, these structures had to be made of logs (Fig. 6.14). Very little remain of these light shelters, comprised of earth and wooden roofs, except for some wooden floors. However, evidence suggests that not all earthwork bunkers were completed and that those which were finished were built with any material soldiers could get their hands on, like wooden doors from the nearby villages, since door latches were found in some of the bunkers.

There is further evidence that the main battle line was never fully completed. In several locations, some gun pits for artillery can be detected. At one such location, five gun pits can be identified, three of which are interconnected by a trench (Fig. 6.15). The gun pits are sub-circular structures with a diameter of 8 metres, protected by an earth wall at the front and flanks. FLAK-positions are often circular or sub-circular. Ammunition or fuel bunkers can be ruled out, since these features tend to have very distinctive rectangular or square earthwork berms and were spaced further apart. If these structures were intended to be semi-permanent, one might expect to see evidence of peripheral ammo storage as well. However, no such features were accounted for in the direct surroundings, suggesting that no artillery was, in fact, ever installed at these gun pits.

Since the larger part of this defence line was built with wood and earth, its remains are very vulnerable and under continual threat. As can be seen clearly on the DEM, the trenches completely disappeared at the edge of the forest, where the land is used for agricultural purposes. Some Iron-Age Celtic fields are

---

95 Fleischer 1998.
97 Pers. comm Dwayne Beckers.
98 Bunker typology will be discussed in detail within the next paragraph.
also shown on the DEM of the site. In order to understand what happened in the area in 1944–1945 more fully, one depends on the archaeological record. A combination of a topographic survey by means of LiDAR data and a field survey have already revealed some valuable insights. It is clear that this forest only represents a microcosm of a conflict site, linked to a far larger militarised landscape.\(^{100}\) In order to maximise the impact and educational value of the site, further archaeological research is highly recommended. For instance, a small-scale (trial) excavation could provide more insight into the nature, condition and state of preservation, as well as the presence of archaeological deposits associated with the trench system. The topographic survey can already be used to select interesting areas for future research.\(^{101}\)

Given the importance of WWII in public memory in the Netherlands, a well-preserved portion of this defence line should be memorialised.\(^{102}\) Many features are endangered by mechanised woodland clearance\(^{103}\) and illegal metal detecting, as observed during the field survey. Local associations that care for the preservation of the remaining features of WWII have so far ensured that woodland is only cleared in open spots where no earthwork structures remain. Also, due to the efforts of these same associations, a heritage trail has been laid out through the forest and some information has been made available at the most expressive remains on the trail.\(^{104}\) Community interest is of the utmost importance for the preservation and conservation of historic sites of conflict and it is directly related to the social basis for archaeological heritage management.\(^{105}\)

During WWI, the Netherlands remained neutral. However, there are several German trenches from this era on Dutch territory. In 1916, Germany feared a Dutch assault, and constructed therefore a defence line composed of 84 concrete bunkers and a trench line on a lateral moraine near Stokkum. A 12.5-kilometre-long defence line was constructed between the village of Donsbrüggen and the Reichswald, with another 4.1 kilometres spanning between Elten and Beek. The bunkers were demolished by French troops in 1921. After WWII, parts of Germany were given to the Netherlands. In 2013, part of a German trench was archaeologically excavated and reconstructed.\(^{106}\)

However, these are not the only features of war and conflict in the area. During the Allied Operation Plunder in March 1945, fighting had taken place in the area as well. Several German trenches, constructed in 1944, can clearly be recognized on the DEM (Fig. 6.16). WWII trenches were made differently to those dated to WWII. During WWI, trenches were set up in a minimum of three or more broadly parallel lines and divided into fire, support and reserve trenches. These trenches have a complex typology, determined by hydrological circumstances, terrain, objectives, visual range, nationality and finally, subsequent occupants who may have modified their layout. WWII trenches were not designed for extended occupation and were often built more hastily, lacking some of the features of WWI trenches.\(^{107}\)

This site presents a unique opportunity to compare German WWI and WWII trenches constructed in the same area. Typological differences can always be noted, but a zigzagging pattern is usually dominant. Furthermore, the close relationship between the natural topography and the location of the trenches is striking. Visual dominance was always of the utmost importance.\(^{108}\) After the start of Operation Market Garden, the defence line of 1916 between Elten and Beek, which includes the trenches of Stokkum, were reoccupied and reinforced again in 1944.\(^{109}\)

---


\(^{103}\) Beckers 2012, 19.

\(^{104}\) Pers. comm. Dwayne Beckers.

\(^{105}\) Deeben et al. 1999, 191; Pollard and Banks 2010, 440.

\(^{106}\) Bosman et al. 2014, 74; Van Oosterhout 2014; Wegener 2014, 40–41 and 46; Van der Schriek and Beex 2017, 103.

\(^{107}\) Stichelbaut 2006, 166; Wegener 2014, 43; Van der Schriek and Beex 2017, 105.

\(^{108}\) Cf. Stichelbaut et al. 2017, 244.

\(^{109}\) Wegener 2014, 40–41.
During a field survey, it was ascertained that the German trenches of 1916 are in much better condition than their 1944 counterparts. About 50 metres of the trenches of 1916 have been restored, but even the parts that have not been renovated are still very well preserved. At present, their unexcavated average depth is still about 1.5 to 2 metres. The condition of the trenches of 1944 is much worse. Built to be less wide, their depth varies from 1 metre to only a few centimetres. The second line of WWII trenches are only visible on the DEM and cannot be detected in the landscape with the naked eye. Their visibility is further compromised by natural overgrowth. Furthermore, several large crateresque features

Fig. 6.16. German trenches of both WWI and WWII near Stokkum (Author).

110 This field survey was conducted on 19 May 2017.

111 Van Oosterhout 2014.
are noticed on the DEM as well. These craters seem to be paired, (mainly) suggesting airstrikes again. Although at first they were believed to be WWII craters,\textsuperscript{112} these features turned out to be much older and are actually the result of collapsed Medieval mining shafts. To the north and the south of this site, more of these mining shafts can be detected. Artefacts indicating ground combat (such as cartridges) were not encountered during the field survey.

Sites like Herkenbosch-Rothenbach and Stokkum are usually known locally, whilst remaining unknown on a national level, and their heritage value has hardly been investigated, since these features are often overlooked or simply not recognised in the field. In order to find out what is left and which sites should be considered for protection, excavation and further studies, it is very well worth mapping these sites by means of LiDAR-based DEMs, as these certainly make mapping an area a lot easier. On top of that, it is important that heritage tourism and changing cultural heritage values be taken into account, as well as long-term cultural awareness,\textsuperscript{113} as explained in detail in chapter 3.

\textsuperscript{112} Van der Schriek and Beex 2017, 103-104.
\textsuperscript{113} Capps-Tunwell \textit{et al.} 2015, 259; De Matos Machado \textit{et al.} 2016, 18; cf. Warmerdam and Kok 2017, 6; Van der Schriek and Beex 2017, 105.
The Grebbeberg, a lateral moraine with an altitude of 52 metres, was one of the few places where the Dutch Army halted the German invasion for several days in May 1940. Therefore, it still has a modest reputation in Dutch military history and has not been completely overshadowed by the later events of WWII. It was the most important line of defence in the Netherlands at the dawn of WWII. The site has been subjected to archaeological desk-based research, as well as some small-scale excavations, which showed that one of the known trenches was not Dutch but German and was constructed between December 1944 and April 1945. Both trenches are very clearly visible on the DEM (Fig. 6.17). The two trenches can quite easily be set apart and attributed to the two different nations thanks to the distinctive methods of construction. In the landscape, the Dutch trenches are hardly visible, and although the remaining German trenches are more visible, some parts are still quite difficult to locate. Furthermore, at least one of the trees bears graffiti which seems to be WWII dated: ‘E.H./1943.’

6.3 Landscapes of conflict – air power and German logistics

Landscapes of conflict consist of much more than just battlefields. Behind the frontline, there would be several infantry encampments, airfields, practice areas and ammunition depots belonging to both the Army (Wehrmacht) and the Airforce (Luftwaffe). During WWII, the German Luftwaffe built a harbour and five ‘boats’ on a heathland in Noord-Brabant, the Landschotse Heide, for aerial bombing target practice. It was a training area for the preparation of Operation Sea-lion, the planned German invasion of the United Kingdom. Made of sand, the boats were approximately 50 metres long, about 7 metres wide, and encircled by a ditch. According to oral history, these practice boats were completed with a wooden cabin and a ship mast to make them look more realistic from up above. Below the approach route of the German fighter-bombers, an observation bunker was built.

Because live ammunition was too expensive, the German airplanes dropped concrete bombs on the site. These bombs contained glass tubes filled with phosphor, which would break on impact and thus create a cloud of smoke which could be observed from both the airplane as well as from the observation bunker on the ground. This bunker was usually occupied by two soldiers, commonly older soldiers regarded as unfit for frontline duties. The bunker had a direct telephone line with the headquarters at the military airfield of Welschap near Eindhoven. During the war, German bombers also used this practice site to drop live bombs if it was not possible, for a variety of reasons, to drop their bombs on the marked target. Furthermore, a local archaeological study group demonstrated during a metal detecting survey that the practice boats were also used for machine gun practice.

This practice area should not be considered as an isolated site, but was, in fact, a small part of a far larger militarised landscape. The site had a direct connection with the airfield at Welschap and had also links with the airfield of Gilze-Rijen. The airfields, in turn, were connected to soldiers’ encampments and ammunition depots. Luftwaffe personnel trained at this practice site and the airfield of Gilze-Rijen was also used as an operational base during the Battle of Britain (10 July–20 October 1940). Between the villages of Oirschot and Oostelbeers, the Germans constructed an imitation airfield completed with landing lights and operating personnel to mislead the Allied bombers.
At present, three remaining and partially restored practice boats are still visible on the heathland. However, on the DEM of this site (Fig. 6.18) a fourth boat can be seen clearly in the left bottom corner. There are hardly any historical data available for this site, as it was a secret operation.\textsuperscript{123} Several concrete practice bombs are now used as decoration on the site (Fig. 6.19) and many farmers in the region use them at the entrance gate of their territory. The observation bunker has also been retained (but is not included on the DEMs).\textsuperscript{124} In the 1950s, part of the practice area was designated as a nature reserve, which was home to four practice boats. The fifth target practice boat was outside the area in what has since become arable land. With the aid of the local information panel, the presumed location of the fifth boat could be reconstructed on the colour-scale DEM. It was removed sometime after the war, along with the topsoil, as part of agricultural development.\textsuperscript{125} The aforementioned harbour was most likely also located outside the present-day nature reserve and has therefore been erased from the landscape.\textsuperscript{126}

Located on the heath and within the nature reserve, the fourth boat is in an area of fast-growing vegetation and more or less isolated from the others by a marsh, making it less accessible by foot. This might be the reason that it was not detected when the other three earthworks were restored a decade

\textsuperscript{123} Van der Schriek 2016, 12.
\textsuperscript{124} Beex 2009, 18 and 20; Roymans and Janssens 2019, 37-38.
\textsuperscript{125} Beex 2017, 667.
\textsuperscript{126} New research demonstrated that the practice area was, in fact, much larger. To the north, a merchant vessel and a submarine were also built on the Landschotse Heide. After Roymans and Janssens 2019, 42-43.
ago.\textsuperscript{127} One site visit was conducted after a period of drought that had lasted several weeks, dehydrating the vegetation in the ditch that surrounded the fourth practice boat and thus making its exact location visible on the ground.\textsuperscript{128}

However, the DEM reveals much more information about the site. As explained earlier, grey-scaled shaded relief images proved to be the best solution to detect remains of WWII in the Netherlands. However, colour-scale DEMs also represent surface elevation levels, with white showing the highest ground and green the lowest. According to several websites\textsuperscript{129} and some local oral histories, the surroundings of the practice boats should have been flooded. The DEM of the site shows this is practically impossible since the targets and their surroundings are located on relatively high ground. Furthermore, there is no river or creek in the area to provide the large volumes of water that would be necessary. The most likely scenario is that only the surrounding ditches were filled up with water.

The colour-scale DEM of this practice site (Fig. 6.20) reveals some other interesting features: craters moulded by concrete bombs. These craters are much smaller than those created by high-explosive (HE) bombs. Two of such HE craters are located north of this practice site (not included on the DEM) and their size is considerably larger. The craters formed by concrete bombs were not discovered on a grey-scale DEM and they are not visible in the landscape, because the vegetation is too dense. Many of such craters must have been silted up, but a considerable number of them are still present at the site and should

\textsuperscript{127} Beex 2017, 667.

\textsuperscript{128} This field survey was conducted on 4 August 2017.

\textsuperscript{129} TracesofWar 2018.
also be given the WWII archaeological heritage status enjoyed by the site. On the colour-scale DEM, there is no indication for the presence of any cabins and ship masts on the remaining practice boats. As discussed in chapter 5, features of WWII are not often included on the national Archeological Monuments Map (AMK) of the Netherlands. The remains of the practice site at the Landschotse Heide forms a rare exception to the rule.\textsuperscript{130} Again, community interest was of vital importance when it came to the protection and preservation of this site of conflict. Thanks to local associations, the site is now mentioned on the AMK\textsuperscript{131} and an informational plaque\textsuperscript{132} was unveiled in 2008.\textsuperscript{133}

In May 1940, German troops captured all military and civilian Dutch airfields.\textsuperscript{134} First, they were mainly used as operational basis for the Battle of Britain and as training sites. Later, the tides of war turned and the Netherlands became an important approach route for Allied bombers on mission to Germany. An extensive aerial line of defence was constructed on Dutch territory, existing of radar stations, a flight direction-finding network, anti-aircraft artillery and airfields for fighter planes to intercept the Allied bombers.\textsuperscript{135} In order to protect German territory from the Allied bombing campaign, most military airfields in the Netherlands were enlarged and several new airfields were constructed. The first was built near Volkel (Noord-Brabant) and the second at Peest (Drenthe). However, due to excessively wet ground conditions, the airfield at Peest was never put into service. In October 1942, German troops started to build an airfield at Havelte (Drenthe), covering an area of 900 hectares. Since there was a gap in the aerial defence system between the airfields of Leeuwarden and Twente, this location was chosen for an extra night-fighter base. \textit{Fliegerhorst} Havelte was meant for every type of aircraft, including the

\textsuperscript{130} Kok and Vos (red.) 2013, 21.
\textsuperscript{131} Registered under the monuments number 16788.
\textsuperscript{132} This was made possible by the efforts of \textit{Stichting ’t Loons Heem.}
\textsuperscript{133} Beex 2009, 21.
\textsuperscript{134} Ter Haar 2014.
Messerschmitt Me 262, the first jet fighter in the world. These airplanes needed a longer, paved runway, since the engines would set the grass on fire. The largest runway (Startbahn I) was 1,400 metres long and 80 metres wide. It was constructed with two layers of paving stones, covered with a layer of concrete. The first Messerschmitt Me 262 landed on the runway on 12 October 1944, although this was actually an emergency landing.\(^{136}\)

For the construction, over 4000 forced labourers (mainly recruited from the Amsterdam region) were used, as well as several Dutch contractors. Thirty anti-aircraft positions surrounded the airfield of Havelte. Fifty-one hangars were constructed, in addition to several carparks. Between 150 and 700 soldiers were permanently based at the airfield. All buildings were connected to a sewer system, which was quite a novelty in the region at that time. An ammunition depot was built nearby, code-named 'Friesland'.\(^{137}\) The costs were estimated at 20 million Dutch guilders. To the north, a second runway was initiated, but this project was never completed. In order to divert Allied attention, an imitation airfield was also built near Oude Willem in the summer of 1944.\(^{138}\)

For the construction of the runways, the Germans made convenient use of the lateral moraine (known as the Havelterberg) which lies 17.5 meter above sea level. The heathland was levelled, over 100 hectares of forest was felled and two megalithic monuments (D53 and D54) had to disappear, since they could be used as navigation marks by Allied bomber-pilots. The famous Dutch archaeologist Albert van Giffen (*1884-†1973) made an agreement with the local German command. The Megalithic monument D53 was completely dismantled, but van Giffen managed to stop the Germans from using the boulders for the runway. Instead, they were buried in a large pit. After the war, D53 was carefully reconstructed with the aid of the pre-war archaeological drawings of 1918. The Megalithic monument D54 was only covered up with earth and was restored to its prior condition later, in 1946.\(^{139}\)

The Dutch resistance, in particular Jan Poortman (*1897-†1984), informed the Allies about the construction of the military airfield at Havelte. Soon, the airfield became a target of opportunity for Allied bombers:\(^{140}\)

> “Only two Liberators in the two combat wings had mechanical trouble. B-24H Bugs Bunny (42-52530), piloted by Lieutenant Wescott, of the 467th Bomb Group had a supercharger failure and turned back. Wescott decided not to bring his bombs back to England and selected the airfield of Havelte, five miles north of Meppel in Holland, as a target of opportunity for his ten 500-pound bombs.”\(^{141}\)

On 15 August 1944, Fliegerhorst Havelte became fully operational. Several De Havilland DH.98 Mosquito's attacked the airfield at least ten times, climaxing in the night of 4–5 September, when eight tonnes of explosives were dropped on the site. On 16–17 September, a very severe bombing was conducted by 50 Lancasters and five Mosquito's, delivering a total of at least 222 tonnes of explosives. This attack was part of a larger campaign, which saw 282 British bombers attack the German airfields of Leeuwarden, Havelte (mentioned in dispatches as Steenwijk), Hopsten and Rheine. These airfields had to be eliminated for the upcoming Operation Market Garden.\(^{142}\) According to the war diaries of the Royal Air Force (RAF) Bomber Command, the runways of all the airfields were well cratered during the attacks.\(^{143}\)

The airfield of Havelte was indeed severely damaged, but the runways were repaired within four weeks. A second large-scale bombing campaign on the airfield was conducted on 24 March 1945, during

---

\(^{136}\) Ter Haar 2014; Gerdeng 2015, 7, 15 and 23; Anonymous 2017; Grimm et al. (red.) 2017, 178 and 180-181; Van der Schriek and Beex 2017, 109.

\(^{137}\) Munitions Ausgabe Stelle (M.A.St.) der Luftwaffe 'Friesland'.

\(^{138}\) Ter Haar 2014; Gerdeng 2015, 7, 12 and 16; Anonymous 2017; Grimm et al. (red.) 2017, 178.

\(^{139}\) Ter Haar 2014; Gerdeng 2015, 27-28; Anonymous 2017.

\(^{140}\) Ter Haar 2014; Gerdeng 2015, 7, 9 and 12.

\(^{141}\) De Jong 2003, 290.

\(^{142}\) Ter Haar 2014; Middlebrook and Everitt 2014, 577 and 585; Gerdeng 2015, 13; Grimm et al. (red.) 2017, 182.

\(^{143}\) Middlebrook and Everitt 2014, 585.
which over 270 tonnes of explosives were dropped by 114 B17G’s in preparation for Operation Varsity, the crossing of the river Rhine. This bombardment permanently disabled the airfield. Between 9 and 12 April 1945, the German troops in the region retreated. Several bunkers belonging to the airfield, as well as the ammunition depot ‘Friesland’, were blown up. The following day, Canadian troops liberated the area.

The results of the bombing are evident even today. The never completed runway to the north of the site is not included on the DEM (Fig. 6.21), as the features presented on the DEM would otherwise have been too small. On the DEM of the former military airfield of Havelte, craters are clearly visible, with over 2,000 of them still present in the area. An archaeological analysis can contribute to an evaluation of the strategy, effectiveness and landscape impact of the Allied bombing campaign. The former airfield

---

144 Mission 282 by the U.S. Eight Air Force.
145 Ter Haar 2014; Gerding 2015, 9 and 12-13; Anonymous 2017; Grimm et al. (red.) 2017, 182.
146 Ter Haar 2014; Gerding 2015, 7.
147 Cf. Passmore et al. 2014, 1281 and 1288.
has now become part of a nature reserve and several structures have been preserved in the landscape. After
the war, the paving stones of the runway were used to rebuild houses in Dutch cities.\footnote{148} Between 1989 and
1993, the Dutch Explosive Ordnance Disposal Squad (EOD)\footnote{149} cleared ammunition from an area measuring
approximately 350 hectares at the former military airfield of Havelte, discovering over 2,400 kilos of ammunition.\footnote{150} A
holiday park has been built to the south of the former airfield. As can clearly been seen on the DEM, most WWII-related
structures have been demolished in this area. A conflict site sometimes benefits from having unrelated monuments on it, in this case megalithic monuments.\footnote{151} The area is also scattered with Iron-Age Celtic fields. Many of the former runways are now used as scenic routes. It is also very evident on the DEM that some arable land is used for crops (due to ploughing, hardly any craters are left) and other zones for livestock (where many more features remain). The current preservation of these features can be directly linked to historic and present-day land use.\footnote{152}

In the landscape itself, several structures have been preserved, such as hangars, runways and various craters.\footnote{153} However, many structures can be identified more clearly on the DEM than with the naked eye due to heavy overgrowth. Only one hangar, a so-called Ypenburg Halle, has been made visible on the ground (Fig. 6.22). These hangars were intended for a single fighter plane each and although they were camouflaged with nets, they were usually very recognisable from the sky.\footnote{154} Today, the surrounding earth

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{image}
\caption{One of the preserved fighter plane hangars (Ypenburg Halle) at the former military airfield of Havelte (Author).}
\end{figure}

\footnote{148} Ter Haar 2014; Gerding 2015, 8; Grimm \textit{et al.} (red.) 2017, 182.\footnote{149} Explosieven Opruimingsdienst Defensie.\footnote{150} Gerding 2015, 9.\footnote{151} Cf. Pollard and Bank 2010, 439.\footnote{152} Cf. Geyhle \textit{et al.} 2018, 60.\footnote{153} Ter Haar 2014; Gerding 2015, 8.
walls are about 3 metres high. Not much information on the former airfield is available and the little information presented is often incorrect. After the war, the Dutch Army used the area as a practice site for manoeuvres. As a consequence, the site has been polluted with recent metal artefacts, making it very difficult for metal detectorists to specifically search for WWII artefacts.

The Allied perception of the importance of the German military airfield at Havelte is reflected in the number of bombing raids on the target. Several craters have been preserved of various sizes and depths and they can be plotted accordingly (see Figure 6.12 again), though this requires due care. However, in this case the interpretation of the bombed site can be completed with both RAF and USAAF\textsuperscript{155} archive records of specific air raids, in particular those of September–August 1944 and March 1945.\textsuperscript{156} Most craters are well-preserved and are usually 3 metres wide and between 1 and 2 metres deep. Only a few have filled up with water and several are packed with wood and organic debris. Craters of this type may be receptive to procedures used in military crater analysis and can provide information on the type of explosives, raid height, bomber flight patterns and, for artillery shells, the direction from which the projectile was fired.\textsuperscript{157}

During WWII, several German military support structures were built in the Netherlands. An inventory of these military logistic structures will reveal their complexity and shed new light on the logistical support of standing armies.\textsuperscript{158} In addition, such research will broaden the scope of modern conflict archaeology to the wider context of the organisation and management of military activities by looking beyond the battlefields. German military supply depots are typically located alongside forest roads. During several pilot studies in Normandy that focused on German Wehrmacht (Army) ammunition depots, it turned out that the size and morphology of bunkers are consistent with the requirements of different types of ammunition, fuel, rations and vehicles. These supply depots have hardly ever been subjected to any detailed historical analysis or archaeological evaluation, even though they can be considered a primary source of information. What is their size? What are their characteristics? What is their present physical state?\textsuperscript{159}

Logistical sites have the same long-term preservation potential as the previously discussed sites of combat in forested areas. Offering concealment from aerial observation during the war, these features in woodland locations are now unusually well-preserved archaeological sites. On arable land or in urban contexts, these landscapes would not have survived. The timespan of construction, closure or destruction can vary greatly and is not always easy (or possible) to establish. Again, the main threats these features face are mechanised woodland clearance, road improvement and illegal metal detecting. A thorough mapping of these structures will provide detailed information on specific combat events and bombing operations, a micro-history, and will illuminate the lesser-known aspects of the logistical support of standing armies.\textsuperscript{160}

Archaeologists David Capps-Tunwell, David Passmore and Stefan Harrison created a very useful typology for German logistics depot features in Normandy, France. During a non-invasive field survey in the Forêt domaniale des Andaines, features were classified according to their function, dimensions, and primary mode of construction (Fig. 6.23). Six main types can be distinguished: (1) munitions bunkers Type Ia and Ib, (2) fuel bunkers Type II and Type III, (3) rations bunkers Type IV, (4) vehicle shelters Type Va and Vb, (5) foxholes and trenches, and (6) miscellaneous. The identification and analysis of the various types of bunkers in the Forêt domaniale des Andaines was based on a combination of archival records, aerial photographs and a (non-invasive) field survey.\textsuperscript{161}

\textsuperscript{154} Grimm et al. (red.) 2017, 180.
\textsuperscript{155} USAAF: United States Army Air Force.
\textsuperscript{156} Middlebrook and Everitt 2014, 577 and 585; Capps-Tunwell et al. 2016a, 317, 319, 325 and 327.
\textsuperscript{157} Passmore et al. 2014, 1289; Capps-Tunwell et al. 2016a, 323 and 325.
\textsuperscript{158} Passmore et al. 2014, 1275; cf. Geyhle et al. 2018, 60.
\textsuperscript{159} Passmore et al. 2013, 165-167; 2014, 1281 and 1288; Capps-Tunwell et al. 2015, 235; 2016b, 2.
\textsuperscript{160} Rass and Lohmeier 2011, 195-196; Passmore et al. 2013, 185; 2014, 1280-1283 and 1287; Capps-Tunwell et al. 2015, 235; 2016b, 1.
\textsuperscript{161} Passmore et al. 2014, 1278; Capps-Tunwell et al. 2015, 237 and 239-247.
Type Ia and Ib munition bunkers are commonly spaced 70 to 100 meters apart and arranged in two parallel rows. The bunkers themselves can be recognised as rectilinear pits, surrounded by berms. There is no clear break in size distribution between the two type variants. Type Ib bunkers have a significantly larger layout, but it is still unclear whether the differentiation is a reflection of differing storage specifications for various types of munition or rather a product of varying construction styles. Both the floor and internal walls were covered with wooden planks. On the roof, at least 40 centimetres of soil was deposited for better protection against the weather, moisture, blasts and accidental detonations. The typi-
rectilinear, shallow pits are about 30 metres long and 4 to 5 metres wide. They are spaced at least 50 metres apart, located immediately adjacent to tracks and open-ended. Type II fuel bunkers were used to store fuel drums. Type III fuel bunkers are smaller and typically have only one opening. This Type III bunker is generally interpreted as a fuel storage for jerry cans that could hold about 20 litres each. 163

In contrast to the previously described bunker types, Type IV bunkers for rations were often built by excavating a U-shaped embankment and usually have no partial constructional characteristics. Vehicle shelters can be subdivided into Type Va and Vb. Although it cannot be ruled out that these features were also used to store ammunition or fuel, they are interpreted as individual vehicle parks offering shelter against aerial attacks and enemy reconnaissance. Both variations are usually positioned perpendicular or at a slight angle to the road, creating a visual fishbone-like structure on a DEM. 164

All depots were surrounded by trenches and foxholes. In contrast to those on combat-related sites, their primary goal was protection from air raids or shelling. Their location, immediately behind the various bunker types, also suggests that protection was an important goal. At the same time, if necessary, they could be used in a defensive role. Although this provisional typology needs modification, it has been a very helpful classification for assigning various WWII-related features to a specific storage of requirements of munition, fuel, vehicle or personal shelter and rations by their form, size, and geographical disposition. 165

To supply the armies in occupied territory, ammunition depots had to be established either at a High Command 166 or Army 167 level. Both Heeresmunitionslager (H.M.L.) and Armeemunitionslager (A.M.L.) were intended to hold between 3,000 to 6,000 tonnes of ammunition. It was rare for munition depots to be set up at a Divisional 168 level. Instead, munition supplies from A.M.L.s were often transferred to one or more Divisional Dumps 169 or transfer points, 170 dedicated to a specific ordnance type, such as infantry, artillery or air force. Safety distances were regulated according to depot size. Each individual depot had to be spaced at least 1 kilometre from each other and 150 metres away from buildings, roads and railways. Army regulations also ordered a minimum spacing between the bunkers. Often, the bunkers were arranged according to a checkerboard pattern along forest roads. Faulty or unused ammunition, empty shell cases and packaging materials were collected in a separate bunker which was constructed near the

<table>
<thead>
<tr>
<th>Luftwaffe Munition Depot</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Munitions Ausgabe Stelle 7/VI</td>
<td>Soesterberg</td>
</tr>
<tr>
<td>Munitions Ausgabe Stelle 8/VI</td>
<td>Loon op Zand</td>
</tr>
<tr>
<td>Munitions Ausgabe Stelle 15/VI</td>
<td>Meck</td>
</tr>
<tr>
<td>Munitions Ausgabe Stelle 32/VI</td>
<td>Honswijk</td>
</tr>
<tr>
<td>Munitions Ausgabe Stelle 33/VI</td>
<td>Zwijndrecht</td>
</tr>
<tr>
<td>Munitions Ausgabe Stelle 40/VI</td>
<td>De Steeg</td>
</tr>
<tr>
<td>Munitions Ausgabe Stelle 1/VI</td>
<td>Naarden</td>
</tr>
</tbody>
</table>

Table 6.1. An overview of the Munitions Ausgabe Stellen (M.A.St.) der Luftwaffe sites in the Netherlands (Author).
entrance of the site. A large network of roads and narrow railway gauges ensured the supply towards the front and military airfields.

One of the largest A.M.L. sites in the Netherlands was located at Hoog Soeren, code-named ‘Mia’. During a recent ammunition clearance on the site, some minor excavations were carried out on ammunition bunkers. However, due to its strategic position in the aerial defence of Germany, many ammunition depots belonged to Luftwaffe units and specific airfields. At least seven Munitions Ausgabe Stellen (M.A.St.) of the Luftwaffe were located in the Netherlands, (Table 6.1) in addition to numerous Munitions Umschlag Stellen (M.U.St.). It is interesting to note that Luftwaffe munitions storage practice made widespread use of a three-sided bunker type (classified as Type I), in contrast to Wehrmacht ammunition dumps. If this type of bunker is encountered on a site, it is likely that this part of the ammunition depot was either under Luftwaffe control or represents a discrete Luftwaffe facility. However, further research is needed to resolve the differentiation in supply storage requirements of Luftwaffe depots and to refine our understanding of structural characteristics, their function and links between ordnance types.

Former military airfields, military camps and logistics depots are part of an extensive and well-preserved militarised landscape associated with German occupation and military support in Europe – including the Netherlands. The combination of LiDAR-based DEM analyses, archaeological surveys, aerial photographs and documentary archives shows that German ammunition sites are always adapted to their woodland surroundings and the specific characteristics of the local terrain. Luftwaffe depots were roughly organised according to Army protocols. At the top of the hierarchy was a Luftgau, a specific aerial district, equivalent to the Army’s Wehrkreis. These districts were ranked with Roman numbers (I through XVII). The largest ammunition depots were named Luftmunitionsanstalten (L.M.A.). Larger cities such as Hamburg, Germany, even had two L.M.A.s, since the aerial defence of the city required a large amount of ammunition. The next levels in aerial munition storage were Feldluftmunitionslager (F.L.M.L.) and Munitions Ausgabe Stelle (M.A.St.).

One of the best-preserved Luftwaffe logistics depots in the Netherlands is the M.A.St. 8/VI. located near Loon op Zand. Built in a forest to minimise the chances of aerial detection by the Allies, this depot spanned ten hectares and consisted of many buildings, bunkers, storage facilities, vehicle shelters and even a pool. However, little is known about this specific facility. The depot was established in 1941, most likely to supply the nearby military airfield of Gilze-Rijen. For its fuel and ammunition, this airfield relied on four nearby munition depots, including M.A.St. 8/VI. The first units stationed at this site came from Austria.

In September 1944, the Allied Armies crossed the border between France and Belgium. On 3 September, Brussels was liberated, with the Allies taking Antwerp the very next day. Within four days, the Allies had advanced over 240 kilometers. German troops expected the Allied Armies in the Netherlands within days. On the 5 September, known as Mad Tuesday, the ammunition at the depot of Loon op Zand was partially relocated, but the larger part was destroyed on the spot, creating huge craters in the landscape. The barracks, kitchen and dining room were demolished as well. The ammunition was destroyed at 09:00 hours, causing windows in a 10 kilometres radius to shatter. By the evening, German troops had left the region. The Allies, however, did not continue their swift advance, and the German troops returned the following day.
On 17 and 18 September 1944, hundreds of Allied aircraft passed the village of Loon op Zand. The ammunition depot was on the flightpath of several waves of airborne troops and bombers for Operation Market Garden. Panicked, the Germans destroyed several more ammunition bunkers. Allied fighter planes never attacked the site itself, targeting munition wagons instead. Only on 25 October, ahead of the final liberation of the region, Typhoons attacked the depot in the forest.\textsuperscript{181} Although much of the ammunition was either destroyed or removed, plenty of live ammunition still remained at the former site of the M.A.St. 8/VI. Since too many people were actively searching for (remains of) ammunition, the Explosive Ordnance Disposal Squad (EOD) cleared the area between 1982 and 1992. The swimming pool had already been filled up in the early 1950s, when a person drowned there. The remains of the swimming pool and a large number of bunkers were completely destroyed when the N261 motorway was constructed across the former logistics depot.\textsuperscript{182}

Similarly to some of the sites discussed earlier, community interest was an important reason for the protection of the remaining features. Thanks to local associations,\textsuperscript{183} an information plaque was installed and a walking route set out.\textsuperscript{184} Just like the German logistics depot in the Forêt domaniale des Andaines, Normandy, the site is now publicly accessible. The remaining vehicle shelters, ammunition bunkers and especially the craters form prominent markers in the present landscape. An analysis of the few remaining documents, combined with field surveys and LiDAR data of the site-specific areas can serve as the basis for further research.\textsuperscript{185}

Looking at the LiDAR data with a bird’s-eye view (Fig. 6.24), the elevation of the landscape becomes very clear.\textsuperscript{186} When constructing the bunkers, the Germans used the characteristics of the local landscape in the best way possible.\textsuperscript{187} Most of the bunkers, for instance, were dug into the highest grounds (white

\textsuperscript{181} Didden and Swarts 1979, 10–11, 14 and 26–27.  
\textsuperscript{182} Grootswagers 2005, 108.  
\textsuperscript{183} Heemkundekring Loon op ’t Sandt and Heemkundekring De Ketsheuvel.  
\textsuperscript{184} Grootswagers 2005, 99.  
\textsuperscript{185} Cf. Capps-Tunwell et al. 2015, 238 and 275.  
\textsuperscript{186} Van der Schriek 2016, 13; Van der Schriek and Beex 2017, 108.  
Several important structures are very clearly identifiable (Fig. 6.25). As required by the regulations, a bunker for faulty or unused ammunition was constructed near the former entrance of the site. Each explosive was marked with a number which could be linked to a specific factory. If too much ammunition manufactured by the same factory failed to explode, this would have had serious consequences for any forced labourers working in that specific factory. Ration bunkers of Type IV and vehicle shelters of Type Va can be easily detected on the DEM (see also Fig. 6.26). Type II fuel bunkers are also present at the site. Several craters mark the location of former ammunition bunkers, as
these huge craters were created when the Germans destroyed most of the ammunition on 5 September 1944. These craters are 5 to 6 metres deep and 20 to 25 metres wide. Only a few remaining Type Ia ammunition bunkers are still visible in the landscape. Due to its typical layout, this type of bunker can also be recognised clearly with the naked eye (Fig. 6.27). A trench of nearly one kilometre in length can be discovered as well.

Once we know what to look for, it is very easy to recognise the same fishbone-like structures elsewhere. Although in much worse condition, a German military supply depot can easily be distinguished at the Hoorneboegse Heide (Fig. 6.28). Again, most of the ammunition bunkers were dug into the highest ground, whereas the individual vehicle parks were constructed in the lower areas. The features do not belong to any of the seven known M.A.St. sites in the Netherlands. More likely, this was a smaller ammunition dump connected to the nearby airfield of Hilversum. No information on the history of the site is currently available. The soil is heavily contaminated by the large amounts of ammunition that were once stored here. Due to the use of copper alloys, the inner core of the trees is coloured green (Fig. 6.29). This is a common phenomenon on the former WWI battlefields at Verdun and the Argonne Forest in France, but not in the Netherlands. The remaining features are heavily overgrown and between 20 to 60 centimetres in depth. Woodland clearance threatens the remaining structures of this logistics depot, as was established during a field survey.

---

188 Van der Schriek 2016, 13; Van der Schriek and Beex 2017, 108.

189 This field survey was conducted on 19 May 2017.
Compared with Normandy, France, the Dutch examples look very similar. However, there are many more rectangular bunkers that lie at an angle to the roads, which are most likely vehicle shelters. In contrast, there are relatively few bunkers with patterns that are typical of Normandy munition sites. At the Hoornhoegse Heide, several bunkers seem to have been enlarged at the rear end, which is also unusual. In Normandy, Divisional sites do have open-ended bunkers, but they are arranged at right angles to the roads and are more set back and arranged in checkerboard fashion, as required by German regulations.\footnote{Cf. Passmore et al. 2017, 63–64 and 66; Van der Schriek and Beex 2017, 109.}

In conclusion, the ammunition sites at the Hoorneboegse Heide are rather different and deserving of further analysis.\footnote{Pers. comm. David Passmore and David Capps-Tunwell.}

The difficulties in the supply of munitions and fuel, combined with the overwhelming Allied air superiority, have been widely acknowledged as a significant factor in the German defeat. However, as discussed, supply depots themselves have hardly been subjected to detailed historical analysis or, until recently, archaeological evaluation. These analyses have much to offer, especially where historic documents are lacking or, at best, fragmentary, and they have prompted an evaluation of the effectiveness of the Allied bombing campaign of the German logistics network. During the study conducted in Normandy, it turned out that only one in three depots in woodland areas were successfully identified and partially...
Fig. 6.28. The remains of a German military supply structure at the Hoorneboegse Heide (Author).

Fig. 6.29. A specimen of the inner core of one of the trees at the former German ammunition dump at Hoorneboegse Heide (Author).
destroyed by Allied bombing.\textsuperscript{192} The same rate of success probably applies to the situation in the Netherlands, but further research is required for a proper analysis.

At present, none of the researched logistics sites in the Netherlands show any evidence of bombing by the Allies. The degradation and destruction of the local infrastructure proved to be much more effective. The limited success of bombing on these sites camouflaged by forests proves the effectiveness of woodland settings for such facilities. The transport difficulties for the German Army are further underlined by the amount of unused ammunition left at depots. Some of the stored ammunition was detonated by retreating troops, but many sites had to be cleared of ammunition after the war.\textsuperscript{193}

\section*{6.4 Landscapes of Conflict – Behind the Lines}

Away from the immediate frontline, sites such as refugee and internment camps or practice trenches can be discovered.\textsuperscript{194} With regard to internment camps in the Netherlands, only the infamous concentration camps of WWII – Vught, Amersfoort and Westerbork – have received any archaeological attention,\textsuperscript{195} as described in chapter 4. However, during WWI, several internment camps were also constructed in the Netherlands, although for different purposes, which left an archaeological imprint on their former location.

In July 1914, the first Belgian refugee crossed the Dutch border in order to avoid the menace of war.\textsuperscript{196} When German troops invaded Belgium on 2 August 1914, a flood of Belgian refugees moved to the Netherlands. Over 1.5 million Belgian citizens sought shelter and protection in neutral or Allied countries – the Netherlands, France and the United Kingdom. On 7 October, at least 30,000 Belgian refugees had already crossed the border at Roosendaal. Approximately 1 million Belgians initially fled to the Netherlands, which had remained neutral, but in the first months of the war, this number decreased significantly. By November 1914, only 324,000 Belgians remained in the Netherlands, dropping to 126,000 one month later. Between 1916 and the end of WWI, about 100,000 Belgians remained on Dutch territory. Some travelled to the United Kingdom and others went back home – now occupied by Germany. The United Kingdom accommodated around 150,000 Belgian refugees and France gave shelter to the largest number of about 325,000 for the duration of the war.\textsuperscript{197}

Initially, refugee care was not well organised in the Netherlands. Bergen op Zoom, for instance, counted 16,500 inhabitants in 1914, but the city had to take care of over 110,000 refugees. The vast number of refugees obstructed traffic and the outbreak of disease became more likely by the day. Therefore, military command urged that the refugees be spread more equally over the rest of the country.\textsuperscript{198} At first, Belgian refugees were accommodated in empty churches, factories and by families. Soon, rental prices skyrocketed, and only middle-class refugees could afford private lodging. The refugees were also divided by their social status. The Dutch government subdivided the Belgian refugees into three social groups: (1) dangerous and unwanted persons such as criminals and prostitutes, (2) ‘less welcome’ individuals, like labourers, and (3) the ‘decent deprived individuals.’ Wealthy refugees were not considered. Soldiers were detained in POW camps for the duration of the war and divided by nationality.\textsuperscript{199}

\textsuperscript{192} Passmore \textit{et al.} 2014, 1281 and 1288; Capps-Tunwell \textit{et al.} 2015, 259; 2016b, 1 and 25.

\textsuperscript{193} Cf. Capps-Tunwell \textit{et al.} 2016b, 2, 29 and 32.

\textsuperscript{194} Cf. Stichelbaut \textit{et al.} 2017, 246.


\textsuperscript{196} Moeyes 2014, 95.

\textsuperscript{197} Amara \textit{et al.} 2004, 7, 11 and 14; Moeyes 2014, 104; Kriegsman 2016, 9 and 15.

\textsuperscript{198} Moeyes 2014, 96 and 99.

\textsuperscript{199} Amara \textit{et al.} 2004, 13 and 25; Wils 2010; Moeyes 2014, 100 and 114; Van Bruggen 2015, 20; Kriegsman 2016, 9, 15 and 195.
In November 1914, the Dutch government decided to set up several refugee locations, corresponding to the division of the Belgian refugees. The word 'camp' was consciously avoided, due to the negative connotation it had received during the Second Boer War (1899–1902). These locations were called 'Belgian villages' instead. Criminals were housed in a penal colony at Veenhuizen. At Nunspeet, Ede, Uden and Gouda 'Belgian villages' were constructed. The refugee centre at Nunspeet was the first site to be completed, and though it could house 13,000 fugitives, it never had more than 7,050 inhabitants. The Belgian villages at Ede, Uden and Gouda were completed in early 1915 and could each accommodate up to 10,000 refugees. Ultimately, these numbers were never reached, and the Dutch government never managed to accomplish the planned social division. The three largest refugee centres cost respectively f411,550 (Nunspeet), f429,770 (Uden) and f785,430 (Ede). At first, these Belgian villages had a bad reputation among refugees.200

The refugee site on the heathland of Ede was meant for 'decent deprived individuals' and was much more comfortable than the other sites, featuring recreational facilities and running water, central heating and electricity in all barracks (Fig. 6.30). The village even had its own telephone connection. The heating costs alone amounted to f2,000 each month, and Dutch protestant locals were quite jealous of all the facilities given to the Belgian catholic refugees in their community. The barracks were made of wood and all had double walls. Facilities for children, such as the kindergarten, maternity ward and the children's hospital, even had triple walls. The first barracks were completed in February 1915.201

---


201 Van Bruggen 2015, 20-21, 27 and 25.
The Belgian refugee site in Ede was subdivided into four villages, of which three were living areas: Schelde-dorp, Maasdorp, Leyedorp. The fourth, communal village was home to the power plant, church and schools and remained unnamed. Each living area could accommodate about 3,000 inhabitants. However, no more than 5,340 people ever lived in this Belgian village. Leyedorp was never inhabited due to over-capacity. Therefore, several barracks were used for recreation. Outside the refugee centre, 153 separate houses were built, funded with financial aid received from Denmark. Hence its name: Deense Dorp, the Danish village. After July 1915, the number of inhabitants continued to decrease. Since all Belgian villages had to deal with overcapacity, the Dutch government decided to close the site at Ede in January 1917. Its design turned out to be too expensive in the long run and the Belgian refugees were relocated to the less comfortable refugee centre of Nunspeet. An exception was made for the (wealthier) refugees at the Danish village, who stayed there until the end of the war.202

After the armistice of 11 November 1918, the first Belgian refugees started to return home, but the repatriation really took off in 1919. Parts of the Belgian (and Danish) villages were used for the reconstruction of some demolished towns on the former frontline in Flanders.203 Soon, the former refugee sites were forgotten, and they would later be overshadowed by the events of WWII. The refugee site of Ede turned into heathland again. In the Netherlands, there is no vivid memory of WWI, although there still are some remains of this era. One of the most poignant monuments is located at Amersfoort, where

203 Amara et al. 2004, 32; Van Bruggen 2015, 80-84 and 127.
construction was started on a monument for the Belgians in 1917, as part of relief work. It was finished in February 1918, but its official inauguration had to wait until 22 November 1938. After WWI, the Belgian state claimed parts of Dutch territory as compensation for war damage – the Belgian government was not pleased when German troops were granted permission to retreat to Germany over Dutch territory in November 1918, and was outraged when Kaiser Wilhelm II was given asylum in the Netherlands. These claims only resulted in invidious tensions between the two nations.204

Only by the end of the 1970s was some attention given to the history of Belgian refugees in the Netherlands during WWI. Eventually this resulted in the construction of a monument in 1984 at the former Belgian village at Ede (Fig. 6.31). According to several sources, including the information plaque at the site itself, the monument is located at the village’s former junction – the Koningin Wilhelmina Laan, running from north to south, and the Cort van der Lindelaan, leading from east to west.205 However, on the DEM (Fig. 6.32) of the site, revealing the boundaries of the former refugee village, it is clear that the monument is not on the correct location, but, in fact, in the (uninhabited) Leyedorp. When the DEM is combined with the plan of the site at Ede, a new, detailed and correct map can be created with all the former barracks and their functions (Fig. 6.33).

As early as 1899, the heathland near Ede was used as a military practice site. Even today, some parts of this area are used by the Dutch Army for manoeuvres. A little to the north of the Belgian village of Ede, some trenches can be detected on the heathland (Fig. 6.34). These were practice trenches constructed by the Dutch Army during WWI. A study into WWI practice trenches was recently started in the United Kingdom, and in the first major survey of its kind, the full extent of trench networks and

204 Wils 2010; Kriegsman 2016, 80-81.
205 Wils 2010; Van Bruggen 2015, 6, 16 and 135.
Fig. 6.33. A detailed map of the former Belgian village of Ede (Author).
Fig. 6.34. A DEM of the WWI era Dutch practice trenches on the heathlands near Ede. Several Celtic fields and prehistoric burial mounds are also visible (Author).
defensive fortifications was revealed. This study made use of both local history and LiDAR data.206 On the surface, most of the Dutch practice trenches can be detected very well. Others are overgrown and are only visible on the DEM. In 1944, British airborne troops landed nearby on the Ginkelse Heide during Operation Market Garden, which is why some visitors wrongly think that these features are related to WWII.207 Most likely, this is also the reason that some evidence of metal detecting was encountered during the field survey.208

The vast number of detected features related to WWI or WWII, their distribution and their variety are valuable indications for the level of industrial (or total) warfare in the Netherlands. The first results already point out the unprecedented spatial extent of the militarised landscape. Most of the archaeological remains of both World Wars have never been documented or have, at best, been documented sporadically. All too often, excavations are limited to battlefields and infamous concentration camps, if they are conducted at all. Other features, such as German airfields and logistics depots, practice sites and refugee camps, are often ignored, overlooked or simply not recognised.209 Far larger zones than is currently acknowledged form a complex and multilayered landscape of conflict, which is not only restricted to craters and trenches. Both the frontline and the logistical areas behind form a landscape of (modern) conflict. Most of these sites require better protection, since they are often not used for tourism purposes and generally have no form of monumental status. The discovery of those hidden conflict sites opens up new perspectives for further multidisciplinary research of militarised landscapes, both in the Netherlands and abroad.210

---

206 Quinn 2017.
207 Wils 2010.
208 This field survey was conducted on 19 May 2017.
209 Some sites, like the airfield of Deelen, are still in use by the Dutch Army and are therefore inaccessible.
Chapter 7 – Summary and final debate

A number of broad international themes have been discussed in this study: battlefield archaeology, aviation archaeology, (illegal) metal detecting and the involvement of the general public to mention just a few. A wide range of methods and techniques are available for conflict archaeologists, but they cannot all be applied in the Netherlands for various reasons. The development of a methodology and excavation skills is limited by several laws, for instance, which is why research methods other than excavations will be needed. The primary research question of this study was if conflict archaeology is at all possible in the Netherlands, given its laws and legislation. I have demonstrated that it is, in fact, possible, but as long as there is no legal infrastructure to support proper conflict archaeology (i.e. excavations), its most prominent strength are non-invasive techniques (like LiDAR) for interpreting features of (modern) conflict and showcasing their significance and research potential.

In this final chapter, the main fields of tension for conducting conflict archaeology in the Netherlands are highlighted. First, community interest versus scientific interest will be discussed. The study of conflict has been of great interest to the general public from the very start. In contrast, scientific interest in the field was, for a long time, limited, since landscapes of modern conflict were not widely recognised as important subjects of archaeological study. However, in recent years, awareness of the societal and scientific importance of conflict-related remains has grown. Nevertheless, their touristic value is often very different from their academic value. Further, although historical sources remain the principle source of information for establishing the historical context of WWII-related features, archaeology can add new storylines, but such new insights will be secondary to commemorative and heritage value.

Second, I will discuss heritage management versus research potential management. The increasing popularity of sites of modern conflict not only encourages new developments, but also raises new questions and problems. Sites of modern conflict represent historical, but often also highly emotional value, which hinders the present valuation an selection process. Heritage management has the difficult task of connecting research with policy, spatial development and the general public. The development of a Dutch conflict archaeological approach was hampered by the lack of a multidisciplinary approach that could bridge the gap between policy, community interests and research potential. Although it turned out that the present valuation and selection system can be used for sites of modern conflict, some adjustments are recommended to explicitly provide legal protection for this era.

The third field of tension concerns site-oriented approach versus landscape approach. Instead of researching isolated sites and concentrating on material culture as the main source of archeological information, this study presented a much broader perspective. The archaeological potential of WWII-related landscapes can be surveyed by means of LiDAR-based DEMs, which let researchers place landscapes in their historical context. Best practice involves not only mapping the detected features, but also comparing them and connecting them to existing archaeological and environmental data. Ample examples were adduced to demonstrate the possibilities for conflict archaeology in the Netherlands.

---

1 Homann and Weise 2009, 27.  
3 Cf. Passmore et al. 2018.  
5 Passmore et al. 2014, 1288; Capps-Tunwell et al. 2015, 256; Van der Schriek and Beex 2017, 111.
However, as demonstrated, this will have serious implications for further research, as well as the selection and preservation of such landscapes. A prominent feature of LiDAR-based DEMs are the distinctive archaeological sites of (modern) conflict, mainly in forests and on heathlands, which are as extensive as they are poorly documented. Striking signatures identified within landscapes of conflict include bomb craters, trenches and supply depots. By mapping and interpreting these features, the first steps are made towards identifying and documenting these features as part of our archaeological heritage.

Finally, a first draft for a research agenda on modern conflict will be presented. Essentially, there are no standard archaeological research questions available for landscapes of modern conflict. Although a national legislative infrastructure for conflict archaeology is still lacking in the Netherlands, it is not necessary to develop a whole new array of theoretical concepts. Furthermore, critical academic research on landscapes of modern conflict should be better supported. Hopefully, Dutch conflict archaeological studies will find its place among international literature, which is still very much Anglo-Saxon-oriented.

7.1 Community interest versus scientific interest

As discussed in the previous chapters, conflict archaeology, or military history in general, is rather unpopular in academic circles – in contrast to its popularity among the general public. Furthermore, excavating remains of recent conflict feels completely different than investigating the remains of earlier periods, since the relatively near past is still vividly present through commemoration, monuments and even family pictures and memories. Younger conflicts like WWII, often also related to many contested heritage sites, are more often neglected in the professional field. However, the remains of modern conflict, such as dugouts, trenches, logistics depots and craters, have also contributed to an expressly public or community-driven archaeology. In fact, the recognition of the importance of WWII heritage in the Netherlands was frequently propelled by the interest of the general public, with archaeologists simply responding to a national trend.

Paradoxically, the general public’s increasing interest in conflict archaeology has been a driving force for various scientific research projects, archaeological excavations and exhibitions. On several occasions, professional archaeologists successfully worked together with the (local) community, for instance during the Defence of Britain project (1995–2005) in the United Kingdom. In Flanders, groups of amateur archaeologists started to excavate the remains of WWI as early as the 1990s. Here, professional archaeological interest in the remains of modern conflict started only in 2003, after a road construction project. For the first time, research questions had to be formulated for the archaeological remains of WWI in Flanders. Nobody knew how much would be found and how well it would be preserved. How would the construction of the motorway damage these features? How many human remains could be expected? Was the area important enough to be considered archaeological heritage? No research strategy was available at the time for excavating such ‘modern’ remains.

Unfortunately, community interest is also expressed in many illegal excavations or, even more straightforwardly, treasure hunting, as demonstrated in chapter 5. Metal detecting has become a general problem all over Europe ever since the 1980s. Illegal excavations have also damaged many former sites of conflict.
in the Netherlands. By its very nature, illegal metal detecting is a hidden activity. While archaeological finds should always be reported in the Netherlands, it is recognised that this does not always happen. The extent of damage such activities might cause to the potential for future archaeological research is currently unquantifiable. However, it is certain that every year both known and unknown archaeological sites are damaged. Although modern conflict-related sites represent an important part of recent history, they are not protected to the same extent as archaeological sites of older periods, due to a general lack of academic interest. Unfortunately, these sites of modern conflict are very popular amongst metal detecting communities, as demonstrated.

As a specialised branch of archaeology, modern conflict archaeology is new in the Netherlands and critics have argued that the WWII-related fieldwork has not made an actual scientific contribution or resulted in a better understanding of historical events so far. However, although WWII-related excavations might not have resulted in significantly new scientific insights yet, the societal impact of such research should not be underestimated. As demonstrated in various countries, conflict archaeology can provide new insights into the events that occurred at a particular site. Another practical reason is that, even when archaeologists recover and record such information, the archaeological remains of this era are diminishing at a much faster rate due to erosion, ploughing, various types of development, mineral extraction and removal by collectors who do not make any records of their finds. Therefore, this archaeological evidence should be recorded when encountered during excavations before it is too late. On the other hand, research should not only focus on excavation, but also on heritage management and commemorative practices. With regard to the more modern eras, these themes cannot be separated. Conflict archaeology has the potential to offer a basic framework for the study of human conflict from prehistory up to the present. In recent decades, conflict archaeology has established itself as a distinct multifaceted field with different theoretical and cross-disciplinary orientations and related methodologies for the prehistoric, the historic and the modern period respectively. The underlying themes regularly explore and reach beyond boundaries of both nations and disciplines.

Fortunately, a growing professional interest in the archaeology of WWII is noticeable in the Netherlands. The provincial archaeological depot of Zuid-Holland now accepts artefacts dating from WWII, for instance. The perception of heritage management has also changed since the start of the 21st century, with people recognising that conflict sites are the scene of historic events at a specific time and in a specific place. Scholars also have an academic responsibility to grapple with issues of past violence, although such research may be integrated into national or ethnically driven views of the past. Artefacts of modern conflict are not only to be considered historical objects or functional items, but they may be considered as being of emotional value as well, which goes beyond their academic value.

The ‘Buried Past of War’ project (2011) was the first academic endeavour to systemically record features, artefacts, and records of WWII in the Netherlands. During this project, which was funded by

---

13 Pollard and Banks 2010, 440; Van der Schriek and Van der Schriek 2014, 237; Gundersen et al. 2016, 164.
18 Schute 2013c, 7; Kok and Warmendam 2014, 79.
20 Armit et al. 2006, 3; Rass and Lohmeier 2011, 117; Sutherland 2012, 41.  
21 Schute 2009, 100; 2013a, 12 and 15; 2013b, 8; Kok and Vos (red.) 2013, 39–41; Banks 2014, 173; Leje and Hambourg 2014, 64; Sagona and Birkett-Rees 2016, 83.
22 Kok and Wijnen 2011, 14; Van der Schriek and Van der Schriek 2013b, 33; 2014, 230–231.
the Netherlands Organisation for Scientific Research (NWO), an inventory was taken among Dutch archaeologists (working for provinces, municipalities or commercial companies) to determine the number of WWII-related studies in the Netherlands, resulting in 81 entries, from 1984 up to 2011, of individual excavations. For the larger part, WWII-related features were considered ‘bycatch’, but they were nonetheless included in the archaeological reports. The recovery of crashed aircraft and desk-based studies were not included. Most entries concern excavations, but some field surveys, chance findings and pilings are also included. For this study, the 2011 data have been expanded with excavations published in archaeological reports or elsewhere (see Fig. 7.1 and appendix). The number of findings at each of these individual studies ranges from just two cartridges (such as during the 2001 study at Appelbergen) to entire trench systems (for instance at Scheveningen in 2014). Both the diagram of Fig. 7.1. and the appendix can give a somewhat distorted picture. If no WWII-related excavations were conducted in any given year, this does not mean that no features were encountered or reported. In 2003, several archaeologists also excavated remains of the war, and more WWII-oriented excavations have been conducted since 2010. All double entries of the 2011 inventory have been filtered out. Undated excavations were not included. Sites where test pits were dug and excavations were conducted during different campaigns are counted as one study. All known archaeological aircraft recoveries are also included in the presented data.

In 2014, another inventory was taken, producing 93 entries: 56 excavations, 22 test pits, 11 archaeological supervisions and 4 aircraft recoveries. Several entries correspond with the 2011 data, whereas others are self-evidently of a more recent date. Overall, the results were similar to the 2011 inventory and where possible, the two were merged. Unfortunately, the entries of the latter list did not mention the

---

24 NWO: Nederlandse Organisatie voor Wetenschappelijk Onderzoek.
26 Bosman et al. 2014, 80-81.
exact year the studies were conducted, resulting in some discrepancies. In addition, it should be noted that not all researches conducted since 2014 have been published yet. The list of WWII-related excavations is by no means exhaustive, only indicative, but hopefully it represents the diversity of studies in the Netherlands in both time and space. The 115 WWII-related projects presented here are all studies that are known by the author and were conducted from 1984 up to 2017. In contrast, between 2008 and 2018, over 150 archaeological excavations focusing on WWI were conducted in Flanders alone. However, the entries do demonstrate a steady increase in the number of WWII-related excavations in the Netherlands since 2005, which is not necessarily surprising, seeing as this year marked the 60th anniversary of the end of the war. Remarkably, it seems that the revision of the Monuments Act in 2012, after which archaeological remains that were less than 50 years old could also be included, did not lead to (another) significant increase. The upward trend had already started several years earlier.

Nevertheless, not all excavations are carried out as a result of the increased interest in the remains of WWII. In the municipality of Waddinxveen (Zuid-Holland), for instance, a new residential area was to be constructed. In accordance with standard procedures, a desk-based archaeological study was carried out, followed up by some small-scale excavations to assess the archaeological value of the site. The scope of the study encompassed all periods, except for WWII. Some locals raised objections to these development plans and successfully demonstrated that not all relevant historical periods were investigated at the site. Therefore, an additional archaeological excavation was conducted in order to map and investigate the remains of a German defence line in the area.

Figure 7.2 and the appendix shows the geographical distribution of the research conducted in the Netherlands. The greater part of WWII-related excavations was carried out in the southern and eastern provinces. The provinces in the north are clearly underrepresented. Airplanes, however, crashed all over the country, and heavy fighting took place on the island of Texel at the very end of the war. In the night of 5–6 April 1945, a Georgian battalion, incorporated into the German Army, revolted. Though initially successful, German reinforcements arrived and violently suppressed the rebellion. Although the rest of the country had already been liberated, fighting continued between German and Georgian troops until the arrival of Canadian soldiers on 20 May 1945. However, since no Allies were involved, it was deemed to be of less importance in the collective (or national) memory. Both historical and archaeological research into WWII landscapes focus on the well-known battlefields from an Allied perspective or on the notorious concentration camps. Sites in the rearguard, such as logistics facilities, hardly receive any attention and at famous battlefields such as Arnhem, the German story remains underexposed compared with the Allied side. With regard to WWII, there is a strong emphasis on ‘right’ (Allied) and ‘wrong’ (Axis), in terms of heritage as well as the archaeologically recovered artefacts. From an archaeological point of view, all features are equally important, regardless of former alliances.

Of course, local communities, project developers, politicians and archaeologists usually have different views on and different needs and desires regarding archaeological research. Although the archaeologists were quite pleased with the outcome of the study conducted at Westerbork, and though the interaction with the general public meant it became a perfect example of community archaeology, the management of the memorial centre of Westerbork was initially less enthusiastic. Parts of the memorial had been substantially disturbed and due to the availability of a large number of historical sources on the former

29 Bosman et al. 2014, 81.
30 In fact, with over 2,000 air crashes in the Northern Netherlands alone, this region has the largest crash density in the world.
33 Teters 2013, 26.
concentration camp, the management was not convinced that these excavations would add any new knowledge.\textsuperscript{35} However, archaeologists need a detailed understanding of the landscapes of conflict. What are the common features and finds of modern conflict? How are they organised and connected? For proper conflict archaeological studies, historical analysis remains necessary to fully establish the historical context. On a micro-level, the research at the Allied and German foxholes at Wolfheze were considered interesting (see chapter 6). Some of these shelters were built before the fighting, others were clearly con-

\textsuperscript{35}  Mulder 2016, 2.
structed under battle conditions, as demonstrated by the archaeological survey. For local communities, such research into their local history can be regarded as being of great importance, thus making it just as relevant – despite the possible lack of truly new insights.36

7.2 HERITAGE MANAGEMENT VERSUS MANAGEMENT OF RESEARCH POTENTIAL

Modern or total war impacts every aspect of civilian life and leaves numerous material and immaterial traces (memories) in the landscape. Besides the industrial aspect of modern warfare, it also comes with political and national motives, and ethnicity, identity and heritage management all have an important role in both past and present. In more recent conflicts, war was not limited to some distant and isolated battlefields – whole landscapes became militarized, including densely occupied zones with villages and cities. Modern warfare transformed entire landscapes, from trenches in the frontline to internment camps, logistical facilities and weapon factories behind the frontline.37 The legacies of modern warfare are far-reaching and never remain static. Memorialisation, influenced by national politics and social changes, constantly reshapes the past in the present.38 In France, for instance, the soldiers from the colonies killed during WWI were of minor importance in commemorative practices for decades. However, after the violent plundering in the suburbs39 of Paris in 2005, the former president of France, Jacques Chirac (*1932–†2019), ordered the construction of a monument near Verdun for all Muslim soldiers killed during WWI in order to create a sense of a shared past (Fig. 7.3). In the Netherlands, though on a smaller scale, similar attention was given to a chance find of traditional cooking pottery that had belonged to a Moroccan soldier (Fig. 7.4). In May 1940, the Dutch Army was supported by some French colonial units. In an era marked by tension between the Dutch and the Dutch–Moroccan community, this finding was used to demonstrate the bond between the two countries.40 However, historically, there was not really such a bond, as the ancestors of the Dutch-Moroccan migrants from the Rif area were recruited into Franco’s fascist troops during the Spanish Civil War (1936–1939), whose Moroccan colonial army at the time was feared by republicans for their unknown cruelty.41

According to Article 19 of the Vimy Declaration for the Conservation of Battlefield Terrain, “a battlefield terrain and any commemorative layer will be distinguishable from each other, yet mutually supportive and complementary.”42 When defining the values of landscapes of conflict, the intrinsic, the commemorative and the economic value should all be taken into account, since they are inextricably linked in contemporary heritage management.43 In the United Kingdom, a battlefield register was first established in 1995. This was the first time that official interest was shown in sites of conflict as components of the historic environment. Before, sites of conflict had not been entirely neglected, as they also played a role in the long-term interest in commemoration. However, when monuments were erected on specific locations, the battlefield itself was often (partially) destroyed – commemoration was the prime goal, not preservation. Over the years, this perception has changed. Violent events can be an important part of a nation’s history and might even represent key moments in the construction of modern national and European identities. The way violent conflicts are commemorated varies greatly through space and time. Furthermore,

39 Suburbs (in the larger cities) of France are often largely inhabited by postcolonial residents (such as Algerians and Moroccans).
40 Scheijvens 2005, 184 and 189.
41 Pers. comm. Rob van der Laarse.
one must bear in mind that sites of conflict may have meaning for a wider community than merely the country in which the event took place. With the exception of civil wars, violent conflicts involve at least two nations.44

Why should archaeologists and heritage specialists be concerned with the preservation of modern conflict sites? Of course, economic issues are important, but preservation must also have academic value. For a start, sites of modern conflict were home to events that took place over a relatively short period of time. Although considered short-term from a conventional archaeological perspective, sites of modern conflict often include events of a very complex nature and intense activity.45 Conflict landscapes can present archaeologists with unusually well-constrained timeframes. To a large extent, the available evidence depends on the era investigated, the weapons used, the type of action and post-depositional factors. Modern war can be considered a unique phenomenon, unlike wars of other, older eras. A specific, multidisciplinary set of methods and techniques is needed to properly conduct research on 20th-century landscapes of conflict.46 The artefacts of war not only represent a historical but also a highly emotional value and they are not simply to be viewed as functional items. Remembrance and the importance of highlighting the horrors of war are the two main drivers for studying the phenomenon of conflict, according to British conflict archaeologist John Carman. Archaeology can also play a role in the creation

---

45 Fraser and Brown 2007, 147; Banks and Pollard 2011, 130; Carman 2013, 55 and 79.
46 Rens 2004, 7 and 11; Saunders 2004, 5; Carman 2013, 42-43 and 87.
of new memories of a conflict. Public memory of war is enhanced through museums, mnemonic devices at specific sites and commemorative practices.47

With heritage management, issues of ownership arise with regard to the past and its material remains. To whom does the (material) past belong? Is ownership guaranteed by direct involvement in the historic event? Or is living in an area of former conflict decisive? Who can rightfully make decisions on the preservation and destruction of those features? These research questions are relevant on an international level. As explained in chapter 3, different interest groups can experience and value cultural heritage and places in different ways - which can even lead to polarisation within a local community. Spatial dimensions are added to a conflict when ownership and control of heritage turn into a struggle between official and individual memory narratives. These questions are constantly debated.48 A special heritage policy for (modern) conflict related landscapes is not needed, but some adjustments to the present valuation and selection system are recommended to explicitly include more recent eras such as WWII.

When working on sites of modern conflict, there are several discussion points to consider, as outlined by British archaeologist Gabriel Moshenska. Are archaeologists responsible for social and political tensions resulting from the research and, if so, to what extent? When is it acceptable to conduct research on sites with a serious risk of injury or even death due to unexploded ordnance? If research is funded by the media, what kind of compromises in terms of research aims, methods and ethics are acceptable? To what extent can research be popularised in order to reach the general public? Should sites of modern

---

47 Saunders 2002, 106-107; Van der Laarse 2011, 33; Carman 2013, 75; Deal et al. 2015, 5; Sagona and Birkett-Rees 2016, 83.

conflict, containing large numbers of human remains, be excavated or be considered war graves and remain untouched? There is a need to thoroughly consider the value and impact of modern conflict studies, both in academic and societal terms. The potential damage, upset and agitation caused by these investigations should be weighed against the potential for gaining new knowledge.⁴⁹

Archaeological research on landscapes of modern conflict should be interdisciplinary and has the strong potential to generate new information. Landscapes of modern conflict are still not widely recognised as important subjects of archaeological study – at least within conventional archaeological frameworks - but at least the number of projects is growing, both in the countries discussed in chapter 4 and in the Netherlands. Hopefully, these projects will eventually show the historical and cultural importance of such sites. New research can provide the foundation for protection and recognise both the historical and archaeological importance of such landscapes of conflict, encouraging that they be treated as memorial landscapes. Research questions concerning landscapes of modern conflict must be reconsidered. Heritage narratives, as well as public engagement, often take a ‘bottom up’ perspective and are connected to memories of the local population.⁵⁰ These sites are part of emotional landscapes and we often already know what happened thanks to historical sources. However, the commemorative value of such landscapes is not often recognised by archaeologists. One of the key differences of modern conflict archaeology compared with older eras is its audience. Archaeological research on traumatic or even contested sites of conflict forces uncomfortable aspects of the past to the forefront of memory.⁵¹ Furthermore, material heritage has taken on more significance now the last witnesses are fading away. Archaeology can play an important role in the preservation, the historical reconstruction and the modern experience of recent conflict sites. The events and individual experiences of people involved or caught up in war can be demonstrated on a detailed, recognisable and, most significantly, human scale.

Archaeology can open up new perspectives on conflict landscapes. However, any such new insights into a thoroughly documented conflict such as WWII will often be secondary to the commemorative and heritage value of identifying, mapping and documenting landscapes and linking them to specific events and actors. Nevertheless, it can be argued that many aspects of the conflict archaeology of WWII landscapes in Europe must still be audited first and currently lack basic archaeological typologies (as demonstrated in chapter 6).⁵²

### 7.3 Site-oriented Approach versus Landscape Approach

Most WWII-related excavations have one more thing in common: they all focus on micro-scale analysis. As demonstrated by the examples in chapter 4.6, archaeological research on WWII in the Netherlands strongly relies on excavations, which are generally site-oriented and include no further analysis of the surrounding landscape. Furthermore, researchers often refrain from proper historical and cultural contextualisation of these features and finds. Archaeologists around the globe tend to treat excavation results as the main source of archaeological knowledge and this methodological simplification is often reinforced by the media.⁵³ On a micro-scale, sites of modern conflict rely primarily on distributional analyses for archaeological interpretation. Areas of heavy combat are usually represented by relatively large numbers and high densities of objects. Mapping these relics should make it possible to illuminate the military

---

⁴⁹ Moshenska 2010, 170; cf. Carman 2013, 80; Sturdy Colls 2012, 82 and 85; Thomas 2016, 140.
⁵¹ Moshenska 2010, 45; Sturdy Colls 2012, 80.
history of a specific site and create a sequential model of events, principally demonstrated by Douglas D. Scott at the site of Little Bighorn in the 1980s. This study has shed an entirely different light on accepted notions and the chronology of the events. Despite the research potential of such distributional analyses, there are several practical problems, besides legislative issues. First, the undocumented removal of relics by treasure hunters can severely impact any future investigation and archaeological interpretation. Second, both commercial archaeologists and academic archaeologists have little experience with and knowledge of the assessment, dating and classification of WWII-related features and artefacts in the Netherlands, which they must be willing to address. Finally, storage facilities are problematic. Modern conflict produces enormous quantities of artefacts. The large amounts of barbed wire and glass shards found, for example, can only be sampled, since it is simply impossible to store all finds.

In 2011, the province of Gelderland and several local municipalities funded a pilot study on this topic. The main goal of this study was to examine the preservation of, the management of and the research conducted on WWII-related conflict sites. It has been used as a primary inventory for the practical and legal problems that arise when dealing with such remains. No actual excavation was carried out, but the participating archaeologists did gain more knowledge on how to recognise such structures and what quantities of features and finds to expect. In contrast to the countries discussed in chapter 4, archaeologists are not allowed to excavate WWII-related human remains in the Netherlands. Human remains are exclusively recovered by the BIDKL, the Recovery and Identification Unit of the Royal Netherlands Army (Fig. 7.5). On the other hand, anyone is permitted to obtain an explosive ordnance disposal cer-

Fig. 7.5. Members of the Recovery and Identification Unit of the Royal Netherlands Army at work (BIDKL).
tificate, which is valid for three years. However, this is a permit to work on sites where unexploded ordnance is expected, not a license to work with live ammunition.

As outlined in chapter 5, current archaeological excavation protocols are in conflict with legislation on weapons and ammunition. Archaeologists are not granted permission to excavate, store and preserve materials such as firearms and live ammunition. Although these finds can be considered archaeological artefacts, it is forbidden to excavate, investigate and exhibit them in the public domain without a special permit. Certified contractors are entrusted with the detection and collection of unexploded ordnance but the actual destruction thereof is only to be conducted by the Joint Bomb Disposal Squad of the Royal Netherlands Army, Air Force and Navy. Although in some cases UXO-clearance companies, the military and archaeologists work together, this is still not common practice. It can be concluded that a national legislative infrastructure to support proper archaeological excavations on sites of modern conflict is still lacking in the Netherlands.

The micro-scale can only be fully understood in a broader temporal and macro-regional context. So far, little research has been done on the nature and extent of conflict sites on such a macro-scale. Sites of modern conflict are dissimilar to many other archaeological sites, since they should be considered as true landscapes rather than isolated locations. It is also important that they are placed in their international context. Non-invasive techniques such as LiDAR-based Digital Elevation Models (DEMs) can lead to a shift from a site-oriented approach towards a landscape approach. As the Belgian archaeologist Bircher Stichelbaut, an expert on image-warping, and his colleagues noted: “[non-invasive techniques have] the potential to link historical literature sources and narratives to the actual material remains, bridging the gap between history and archaeology, and converting geographic locations into meaningful places.” DEMs can be an enormous source of information and are a significant challenge to public policy and heritage management.

LiDAR-based DEMs are great alternatives for excavations and they can reveal substantial information about archaeological remains of WWII. In best practice, (1) the suitability of LiDAR-based DEMs is demonstrated, as well as (2) the age, geographical arrangement and character of the WWII-dated features, and (3) the historical context of those features is defined. However, since this study was an exploration and valuation of conflict archaeology in the Netherlands, the use of LiDAR-based DEMs was largely restricted to the principle aim: their utility on conflict landscapes. The case studies provided in chapter 6, alongside the archaeological excavations undertaken in the past (chapter 4), demonstrate that entire militarised landscapes of WWII often survive, which have the potential to reveal new insights into the events of this period. This non-destructive methodology offers new knowledge and can provide the necessary means for an effective management of the heritage of landscapes of modern conflict. Furthermore, non-invasive methods do take away the need to excavate ‘contested’ sites of the past, whilst also demonstrating the value of conflict archaeology on a much larger scale. The heritage sector can be given a more precise and sensitive method of surveying by means of non-invasive techniques, which can document and process information on the ‘inherent’ qualities of the heritage of war.

The prospection and valuation of WWII-related landscapes of conflict in the Netherlands poses specific challenges for archaeologists. Archaeological excavations of entire conflict landscapes are, as explained, problematic in the Netherlands. The presence of firearms, ammunition and human remains prevent the use of invasive techniques. The analysis of LiDAR-based DEMs has already made an exten-
sive contribution to the detection and valuation of archaeological sites in general and to WWII conflicts sites in particular. Such surveys provide a new framework for the study of landscapes of conflict. The heritage value of these landscapes should not be underestimated.\(^67\) If the discovered features of WWII are no longer considered ‘recent disturbances’ and are regarded instead as an actual part of the archaeological heritage, this will have considerable impact on future heritage management. Landscapes of conflict are often embedded in palimpsests of older and larger landscapes, even though they may form the most prominent components thereof.

LiDAR-based DEMs can be very useful for mapping conflict sites and assessing how these remains should be protected. Further research along this line will stimulate a new perspective on WWII heritage in the Netherlands that encompasses a wider range of monument types and their associated landscapes. Above all, LiDAR-data is an effective and low-cost instrument for the scientific and cultural management of this fragile heritage and can be an enormous source of information.\(^68\) Woodland settings and heathlands are the most promising areas for the long-term preservation of earthwork remains of WWII. In urban contexts or agricultural sites, these militarised landscapes are, generally speaking, not preserved. Woodlands are usually not endangered by spatial development projects, but features in these areas are jeopardised by other serious threats, such as mechanised woodland clearance, road improvement projects and illegal metal detecting.\(^69\) Therefore, research methods other than excavations are needed. In addition to the practical reasons for using LiDAR-based DEMs (low-cost), they are also an ideal way to avoid risks in the field (due to the possible presence of unexploded ordnance) and evade any conflicting legislation. LiDAR-based DEMs (and other non-invasive techniques) allow researchers to: (1) explore both the extent and the current preservation of remains of WWII on a landscape scale, (2) fill in the gaps between known sites (which are normally considered ‘isolated sites’), and (3) acquire insight into the distribution, density and diversity of the remains of WWII in the Netherlands.

For all these reasons, LiDAR-based DEMs are of great significance for researching recent landscapes of conflict. The key value of this new technique for archaeologists is that it can provide an accurate three-dimensional measurement of a surface.\(^70\) For the development of a Dutch branch of conflict archaeology, landscape analysis turned out to be the most promising approach. Research on a macro-scale reveals other information than comparable research on a micro-level. Such an approach recognises the complex and multilayered connections between sites at and behind the former frontline and can demonstrate, for instance, the transportation of troops, logistics and prisoners. The logistics sites, the airfield of Havelte and the practice site at the Landschotse Heide discussed in chapter 6 are all interconnected and are therefore not to be studied in isolation. A multidisciplinary landscape-approach will not only provide a more detailed mapping of patterns and value assessment, but will also yield new perspectives.\(^71\) Archaeological surveys in wooded landscapes and on heathlands demonstrated that further research can significantly enhance our understanding of ground combat. By means of LiDAR-based DEMs, sites or even entire landscapes of conflict can be perfectly identified through trenches, bomb craters and supply depots, for instance. Conflict archaeology provides a broader perspective and analysis of military activities and their impact on landscapes, combatants and non-combatants. However, LiDAR-based DEMs are no ‘Holy Grail’ in conflict archaeology and do not make other techniques unnecessary. Rather, they are an additional source of data.\(^72\)

\(^67\) Meylemans et al. 2015, 14; Van der Schriek and Beex 2017, 110.

\(^68\) Cf. Capps-Tunwell et al. 2015, 259; Stichelbaut 2006, 172; Van der Schriek and Beex 2017, 110.

\(^69\) Passmore et al. 2013, 185; 2014, 1281-1283; Capps-Tunwell et al. 2015, 235; 2016b, 1, 1288; Capps-Tunwell et al. 2015, 256.

\(^70\) English Heritage 2010, 5 and 19; Passmore et al. 2014, 1288; Capps-Tunwell et al. 2015, 256.


\(^72\) Passmore et al. 2014, 1275; Capps-Tunwell et al. 2015, 233-334; Van der Schriek and Beex 2017, 111.
With regard to WWII, we are now at the border of living memory. This has triggered a change in the attitude towards archaeology of modern conflict over the last decade.73 During an archaeological excavation at Meerhoven, a town near Eindhoven in the province of Noord-Brabant, in 2000, several features and artefacts related to WWII were uncovered. These features and finds were also recorded in the archaeological reports, which was quite unique at the time.74 Fortunately, it is now more common to report the remains of WWII in archaeological excavations when they are discovered at a site in the Netherlands. However, the distribution of WWII-related investigations across the country and the number of surveys conducted were as diverse as the research methods and techniques used. Nevertheless, as demonstrated by this study, modern conflict archaeology can be practiced in the Netherlands. A multidisciplinary approach is needed to conduct modern conflict archaeology properly, as each method has its own benefits. First, it is important to develop specific research strategies. A combination of metal-detecting surveys, (selective) small-scale excavations and the use of non-invasive techniques such as LiDAR-based DEMs seems to be most effective, as demonstrated in this study.75

All nations have conflict sites within their territory that represent key moments in their histories and are worthy of protection – although some might question the need for preservation. Obviously, not every site needs its own visitor centre. Community interest has been proven to be an important factor in the preservation and conservation of conflict sites on several occasions.76 In Flanders, the Government aims to protect several (iconic) parts of conflict landscapes, not only on the famous battlefields around Ypres but also lesser known German defence systems around Antwerp. However, just as in the Netherlands, policy plans and research initiatives usually focus on the post-war landscape of remembrance, thus ignoring surface and archaeological remains. By mapping these landscapes systematically, researchers can contribute both to the knowledge of such sites and inform heritage managers and policymakers about the importance of this period, which is often beyond the traditional scope of archaeological research.77

When an archaeological excavation is carried out, the most important position in the decision-making process in the Netherlands is held by the municipalities. As described in chapter 5, Dutch archaeological practice changed significantly after the implementation of articles 5 and 6 of the Valetta Convention78 in Dutch legislation. After the implementation, the archaeological market was opened up to commercial enterprises. Since 2010, basically all archaeological fieldwork has been conducted by archaeological contractors. After 2001, commercial archaeological companies obtained excavation permits from the former National Archaeological Service (ROB), which has now become the Cultural Heritage Agency (RCE). As of 2017, these permits are provided by certified accreditation bureaus.79

Of course, all commercial archaeological enterprises work according to an independent quality control system, are guided by municipal, provincial and national policies and have excavations conducted by trained, certified archaeologists.80 However, the most crucial archaeological results come from large-scale, long-term excavations. When working with short-term contracts, it is very difficult to develop and

---

73 Pollard and Banks 2007, iv-vi; 2011, 128; Sutherland and Holst 2005, 4; Van der Leij and Hamburg 2014, 64.
74 Arts 2017, 121.
75 Cf. Roymans and Fernández-Götz 2018, 3-5.
76 Sutherland and Holst 2005, 3 and 7; cf. Sutherland 2009, 109; Pollard and Banks 2010, 440; Banks and Pollard 2011, 128, 132 and 143.
78 Article 5 describes with the relationship between the preservation of archaeological heritage and spatial development projects. Article 6 describes the commitment for developers to fund compulsory archaeological research.
sustain such long-term programmes. In fact, all archaeological excavations in the Netherlands take place within the context of spatial development projects. Above all, Dutch archaeological legislation is geared towards the protection of archaeological features and finds in situ. Commercial companies therefore primarily excavate archaeological sites that are threatened or sites that are not selected for protection because of their scientific value. Due to this practice, it has become much harder to achieve any long-term academic goals during excavations. However, this problem applies to all archaeological studies and is not restricted to more modern eras.

Cooperation between academic archaeologists, commercial archaeological contractors, amateur archaeologists and the general public is increasing but should be better structured – although this is, of course, easier said than done. Only on a few occasions have commercial archaeologists and academic archaeologists worked together on a more structural basis, for instance during the excavations at Amersfoort (2010) and Westerbork (2011). Improved cooperation between academics and commercial archaeologists, provinces and municipalities would, however, stimulate preservation, as well as the development of methods, theories and knowledge. Due to Dutch law, archaeological research related to WWII conducted by scholars is very marginal in the Netherlands. However, universities can back up the archaeology market by formulating research themes and research goals. Furthermore, they can focus on synthesising (Dutch) conflict archaeology. Commercial excavations focusing on WWII sites with an academic scope are not common in the Netherlands. On top of that, universities hardly have the expertise and authority to play a leading role. In contrast to Germany, the United Kingdom and almost every other European country there is no legal obligation for academic researchers to be involved in archaeological projects in the Netherlands, and after the Valetta Convention, all spin-off projects based on academic research have been privatised as commercial companies with less and less academic input.

Furthermore, it is firmly recommended to adjust conflicting national and local legislation with regard to modern conflict-archaeological research. The selection and storage of WWII-related artefacts should be better arranged. Within Archaeological Monument Care (AMZ), emotional value deserves to be given a more prominent role. Finally, with regard to aviation archaeology, it is highly recommended to set up a single, specialised team. All aircraft recovered so far have been investigated by different archaeological teams. However, not all air crash-sites have to be archaeologically excavated: seeing as some types of aircraft were very widely produced, some WWII aircraft are still in flying condition today. Furthermore, many aircraft were already partially recovered during the war, so the number of complete aircraft that are yet to be excavated and studied is limited.

Thanks to the work of a small number of archaeologists in the Netherlands, and a larger group of conflict archaeologists abroad, we do now have the tools to properly investigate WWII. A difficult challenge facing conflict archaeology is the application and integration of new studies into a meaningful overarching research framework. Field research should not only be used as a means of removing problematic barriers for spatial planning or for ‘exciting’ media content. It is of vital importance that the theoretical framework grows along with methodological advances. More than ever, we need a research

---

84 Staatsblad 292 (Bulletin of Acts and Degrees, 292), Article 22.
87 Kok and Vos (red.) 2013, 49, 55 and 137; Bosman et al. 2014, 112; Van der Weerden and Verspay 2015, 22 and 42; cf. Lewis 2016, 130.
88 Van der Kamp and Hendriksen 2010, 76.
89 Pers. comm. Major Aalberts, Royal Netherlands Airforce.
agenda that does not only encompass physical remains, artefacts and isolated sites, but also includes entire landscapes of conflict. In the past, conflict studies relied on historical sources and hardly upon any archaeological evidence, and this information has long been used for the management and protection of such sites. Both historical documents and oral testimonies are derived from human memory and can contain intentional or unintentional prejudice. Only few people can give an accurate account of the entire event. Because both world wars are relatively recent, archaeology is well positioned to confirm or modify the historical narrative on these events. In best practice, mapping and interpreting WWII-related features draws on a multi-disciplinary approach of LiDAR-based DEMs, the study of aerial photographs, geological data, historical sources and field surveys.

It is therefore important to draw up research protocols for the study of modern conflict. As discussed, there are several data issues at stake: (1) research intensity is not equally distributed across the Netherlands, (2) modern landscapes are subject to frequent transformations, (3) the determination and conservation of materials can be problematic and (4) looting by metal detectorists remains a major problem. The Cultural Heritage Agency is now making an effort to include the archaeology of WWII into Archaeological Monument Care. As demonstrated in chapter 5, this valuation and selection system is, in fact, useful for sites of modern conflict. Although its broad and vague definitions do allow, potentially, for the protection of archaeological sites of modern conflict, some adjustments are recommended. From a policy perspective, current heritage legislation is problematic in that it does not provide legal protection for more recent archaeological heritage sites in most cases. What should be prioritised, which sites of modern conflict are to be investigated, which sites can be ignored, what should be sampled, what should be preserved and stored? As conflict landscapes cover large tracts of land, they cannot be protected in their entirety. Local planning authorities have to act in a site’s best interest. An example can be the criteria used in the United Kingdom to determine the value of crash-sites. If a site meets three of the following criteria, it should be considered as being of (national) importance: (1) Does the site contain remains of modern conflict of which no (complete) samples are preserved? (2) Are the features well preserved? (3) Is the site connected to an important campaign, specific attack or famous person? (4) Is it possible to use the site as a memorial location? Though earlier eras may be prioritised, conflict sites of WWII should no longer be overlooked as they were two decades ago. It can be concluded, however, that conflict archaeology has developed from a sub-discipline focusing on battlefields into an inherently interdisciplinary and more mainstream field, since research into conflict-related themes is becoming ever more common.

91 González-Ruibal 2012, 471.