Part One

LANDSCAPES

Chapter 1

FRONTIERS

The Garden–Wilderness Dichotomy

In 1893 Frederick Jackson Turner presented his seminal essay titled "The Significance of the Frontier in American History," a theory that has had an enormous impact on the perception of the United States' environmental history. Crucial to Turner's reasoning is the association of the word frontier with the advance of civilization, as opposed to "wilderness," or uncontrolled nature.[1] The popularity of this thesis lingers on to this very day, even though environmental historians such as William Cronon have demonstrated convincingly that no so such thing as a primeval wilderness existed when immigrants of European descent settled on the continent and increasingly moved westwards.[2]

Many different definitions of the term "frontier" exist, but all acknowledge that it essentially refers to a boundary, a dividing line of some kind. Scholars have identified political–military as well as cultural, ideological, or ecological frontiers, depending on their respective perspectives. These definitions are not necessarily mutually exclusive, but can cause unnecessary confusion if the word frontier is used as a simple synonym for related words (such as borderland or border). This is especially so since historical sources also employ a variety of terms to describe boundaries (limits, confines, poles), the different connotations of which are often difficult to grasp. Language differences make matters even worse. The word *frontière* in modern French has not the same meaning as frontier in English, for instance, because during the early modern period it became a common term to refer to political boundaries, regardless of their military or ecological significance.[3]

The following chapter uses the original medieval meaning of the word frontier as its starting point, and defines it as a military boundary, a dividing line between "the self" and "the other," where the other is perceived as particularly threatening to the extent that warfare becomes a distinct possibility. The English word frontier derives from the French *frontière*, which in its turn originates in the Latin *frons*, a front(line) of an army or a house. It therefore implies a notion of linearity. The word *frontière* can be traced back to the early fourteenth century, while its use in Spanish and Italian is even older (twelfth and thirteenth centuries respectively).[4] It was not the only medieval term to refer to military–political boundaries, however, and contemporaries often used it along-

1 The essay was published in 1921 as the first chapter of Turner's book: *The Frontier in American History*.

2 Cronon, "The Trouble with Wilderness."

3 Berend, "Medievalists"; Gouguenheim, "Les frontières"; Febvre, "Frontière: le mot et la notion"; Janeczek, "Frontiers and Borderlands"; Rankin and Schofield, *The Troubled Historiography*.

4 Berend, "Medievalists," 66; Febvre, "Frontière: le mot et la notion."

side words such as "limits," "marches," and "poles."[5] Henry VI of England, for instance, declared his intention in January 1427 to overcome the last French centres of resistance, strongholds, on the left bank of the Meuse River, located in Champagne, Thierache, Rethel […], and their *marches et frontieres*.[6]

The mentioning of strongholds is hardly a coincidence, for fortifications constitute an indispensable aspect of the ways frontiers were actually managed or defended. In the interest of clarity, this part of the argument analyzes frontiers in a general way, and leaves the specific ecological impacts of fortifications to the next chapter. Both frontiers and fortifications can be considered as "militarized landscapes," a term coined by Peter Coates and his research group to describe landscapes modified by modern military organizations.[7] Given the emphasis on premodern warfare and the complexity of the ecosystem concept, this study describes a militarized landscape as an ecological milieu in which interactions between armed forces and its physical features have become so encompassing that they can be considered as a defining characteristic. Militarized landscapes are prepared in a direct or indirect way for coping with the possibility of organized violence by armies, but they do not have to be actually engaged in armed conflict. Frontiers for instance can be studied as militarized landscapes because the risk of attack necessitates a more or less permanent military presence.

Because of its close association with enemy threats the concept of frontier is also closely connected to the construction of territories and ultimately to processes of state formation. Any study of the territory concept has to take its history of violence and warfare into account, for the very word territory relates to the military concept of terrain and Latin *terrere*, "to frighten." This analysis adopts the interpretation of "territory" developed by Michel Foucault and Stuart Elden, which is that control over land or space ("territory") and people ("populations") is intrinsically linked. In this way, it connects the chapters of frontiers and policing to each another as two different aspects of territory formation.[8]

The object of the following chapter is to use the historical development of frontiers as militarized landscapes in the Meuse Region to explain the origin of military domains, which constitute a core element in current debates about military forces' "environmental footprint." It seeks to establish whether the idea of a frontier as a frontline against wilderness, or uncontrolled nature, has a medieval origin, and to what extent these medieval perceptions had a role in the establishment of the military training areas that still exist today. This chapter thus lays the basis for the argument that there is little modern or progressive about the ways current military forces interact with ecological systems.

There is a general consensus that during the Middle Ages and the early modern period boundaries became more defined and tended to encompass larger entities. Whereas in the Central Middle Ages many areas in the Meuse Region were characterized

5 Ellis, *Defending English Ground*, 65; Genicot, "Ligne et zone," 31; Gouguenheim, "Les frontières," 54–56; Lieberman, *The Medieval March of Wales*, 11–12.

6 Luce, *Jeanne d'Arc à Domrémy*, 203.

7 Coates et al., "Militarized Landscapes," 465–91; Pearson, "Militarized Landscapes," 115–26.

8 Elden, "Land, Terrain, Territory," 801–7; Elden, "How Should We Do the History of Territory."

by a multitude of jurisdictions and enclaves, some as small as individual villages or even hamlets, the nineteenth century is well known for the dominance of "nation states" with large and clearly demarcated borders or frontiers. Given that boundaries were initially drawn between fairly small entities and tended to become larger over time, it comes as no surprise that boundary markers first developed at the local level became central elements in processes of state formation. The brooks, ditches, hedges, isolated trees, and boundary stones that marked the limits between villages were eventually replaced by "natural frontiers," the mountains, rivers, and forests that, in an ideal situation, separated (nation) states. The fifth line of the German national anthem states that Germany should extend *Von der Maas bis an die Memel* ("from the Meuse to the Neman").[9]

A basic awareness of agricultural developments in medieval Europe is necessary to understand these processes. The Central Middle Ages saw the appearance of nucleated villages, concentrated around a parish church and, in some cases, a noble house ("castle"; see chap. 2). This development corresponds with agricultural systems, or "agroecosystems" if one wants to stress the close entanglement of humans and ecological systems, that distinguish between an intensively cultivated "infield" and extensively used "outfield." This infield is generally located near the village itself and consists of commonly managed agricultural lands that are fertilized regularly by the village flock, which explains the German name *Dungland*. The outfield by contrast is composed of areas that are cultivated more irregularly or possibly not at all. In such a context, it is only to be expected that boundaries between settlements are drawn in their extensive outfields and that the need to clearly demarcate them is a result from local conflicts. Moreover, the description of outfields and common land as *Wildland* or *terres sauvages* strongly suggests that the connection in Western Europe between general boundaries and wilderness originates in medieval agricultural practices.[10]

The relevance of these changes for the historical development of frontiers can be demonstrated by referring to another medieval term: the march. Marches were specially designated jurisdictions located on the limits of the Carolingian empire (for instance, Brittany, Spain, Saxony), headed by a margrave whose main responsibility was to deal with potential enemy attacks. Marches were in effect the frontiers of the Carolingian Empire. The oldest occurrences of the term march, from the sixth century, did not refer to political boundaries, but to the uncultivated land between two properties, "wilderness." In some German-speaking regions it was even synonymous with the term *Wald* (woodland). The notions of frontier and wilderness were thus closely connected to each other.[11]

A charter from 1301 regarding the castellany of Couvin, located at the frontier of the Prince-Bishopric of Liège with the County of Hainaut, clearly shows the close association between military organization and agricultural practices. According to the councillors of Couvin the inhabitants of the castellany, the town itself, and its surrounding

9 Belissa, "La question des frontières naturelles"; Genicot, "Ligne et zone"; Girard d'Albissin. *Genèse de la frontière franco-belge*; Suttor, "Le rôle d'un fleuve."

10 Genicot, *L'économie rurale*, 4:88–102; Hoffmann, *An Environmental History*, 156–65; Hoppenbrouwers, "Territorialiteit en landsheerlijkheid"; Wealer, "Une identité paysagère," 73.

11 Lieberman, *The Medieval March*, 11–12.

Figure 2. The Leo Belgicus prevents Spanish pigs from entering the "Garden of Holland," late sixteenth century. Amsterdam, Rijksmuseum (RM, RP–P–OB–77.682).

villages, constituted one "banner," had the same war cry and alarm, and had access to the common pasture, woodlands, and waterways.[12] The word banner, a flag that organizes armed forces into specific units, derived from *bannus*/*bannum*, the royal right to command, forbid, or punish. It could also, as in this example, refer to a territorial unit in which the inhabitants fought under the same banner and shared control over natural resources. The town of Geldern even designated in 1571 its *Landwehr*, earthen embankments with hedges planted on top of them, which demarcated the city's territory, as a *bantuin*. The area included within the ban is thus denoted as a garden. In Venlo, the toponym *bantuin* has survived until this very day.[13]

The description of specific territories as "garden" enclosures is of particular interest because it reinforces the aforementioned perception of frontiers as wilderness.[14] Gardens figure after all as symbols of human mastery of the natural world. Calling one's

12 Bormans, *Cartulaire de la commune de Couvin*, 21.

13 Geldern, Stadtarchiv, A, no. G9, Stadtrechnung, fol. 250v (1571) (transcript by Rien van den Brand, http://www.scriptoriumempeje.nl); Berens, *Territoriale Entwicklung & Grenzbildung*, 140; Hanssen, *Inventaris*, 481.

14 On the importance of perceptions in geopolitics see Black, *Geopolitics*.

own territory a garden means emphasizing the civilized or cultivated nature of one's own lands versus the wilderness that lay beyond. The medieval Dutch word for garden, *tuyn*, in particular refers to a fence or an enclosed space.[15] Late medieval accounts from Heusden, Geldern, Grave, and Venlo use the word as a verb to describe the making of a fence with planks, branches, and thorn bushes.[16] The use of the garden concept is not just a play on words: wartime areas perceived as lying outside one's own "garden" were far more likely to experience the full extent of armed forces' destructive force, which contributed to the spread of actual wilderness (see chap. 3).[17]

The symbolic depiction of a territory as a garden relates to the late medieval cult of Our Lady, in which Mary was commonly portrayed within an enclosed garden, which represented the Garden of Eden.[18] This garden imaginary rose to particular prominence in the medieval County of Holland. The accounts kept by the count's administration indicate that in the fourteenth century his army actually went to battle with a banner depicting a fence, and Willem van Oostervant, later known as Willem VI of Holland (1404–1417), founded a new chivalric order in 1387: the Order of the Garden (*Orde van de Tuin*).[19] The County of Hainaut, united with Holland through a personal union, also used the term *jardinet* ("little garden") to describe its territory in the 1390s. The diminutive might have been adopted to distinguish it from the *Jardin de France*, which denoted the Île de France.[20]

This emphasis on the medieval origin of the garden terminology puts better-known early modern characterizations into perspective. The French engineer de Vauban's description of France as a "square field" (*pré carré*) protected by a mixture of fortresses and "natural frontiers," for instance, has its origin in these medieval ways of frontier perception.[21] The same applies to the famous "Garden of Holland" (*Hollandsche Tuyn*), which will be forever associated with the Eighty Years War (1568–1648). An etching related to this conflict, dating to the late sixteenth century is of particular interest here (see figure 2). It portrays a lion defending his "garden," a fence, against Spanish pigs. The rendering of Spanish forces as pigs not only reinforces the notion of an enclosed garden,

15 *Middelnederlandsch Woordenboek*, "Tuun" (http://gtb.inl.nl); Rudd, *Greenery*, 165–70.

16 Grave, SLC, Archief Gemeente Grave, inv. no. 217, fols. 6v, 7r, 15r, 26r, 94r, 146v, 151r, 152r, 257r, 258r, 267v, 268r, and 277v (transcript by Rien van den Brand); Bondam, "Oudste stadsrekening," 109–110; de Groot, *De stadsrekeningen*, 1384 fol. 5; 1385 fols. 7, 8, 39; 1386 fol. 7; 1387 fols. 24, 26, 28; 1388 fols. 9, 15, 26; 1397 fols. 8–9; 1399a fol. 8; 1402 fols. 9, 20; 1404 fol. 24; 1405 fol. 14; 1406 fol. 8; 1407 fol. 15; 1408 fol. 10; 1409 fols. 10–12, 14; 1412 fol. 41; 1415 fol. 28; Kuppers, "De stadsrekeningen," 9, 11, 20, 22, 34, 48, 60, 61, 69–72, 83, 92–93, 105, 158, 220, 235, 296.

17 Kroener, *Les routes*, 84, 95–96, 100, 112–13.

18 Miwa, "The Hortus Conclusus," 2–4, 7–11, 54–55, 76–79, 86–87, 128–31; van Winter, "De Hollandse Tuin," 59–64, 102–3.

19 van Tol, "De Orde van de Hollandse Tuin"; van Winter, "De Hollandse Tuin," 31–59.

20 Dauphant, *Le Royaume des quatre rivières*, 211; Flammang and Van Eeckenrode, "Le jardinet de Hainaut," 45–49; de Planhol and Claval, *An Historical Geography*, 104.

21 Bitterling, *L'Invention du pré carré*.

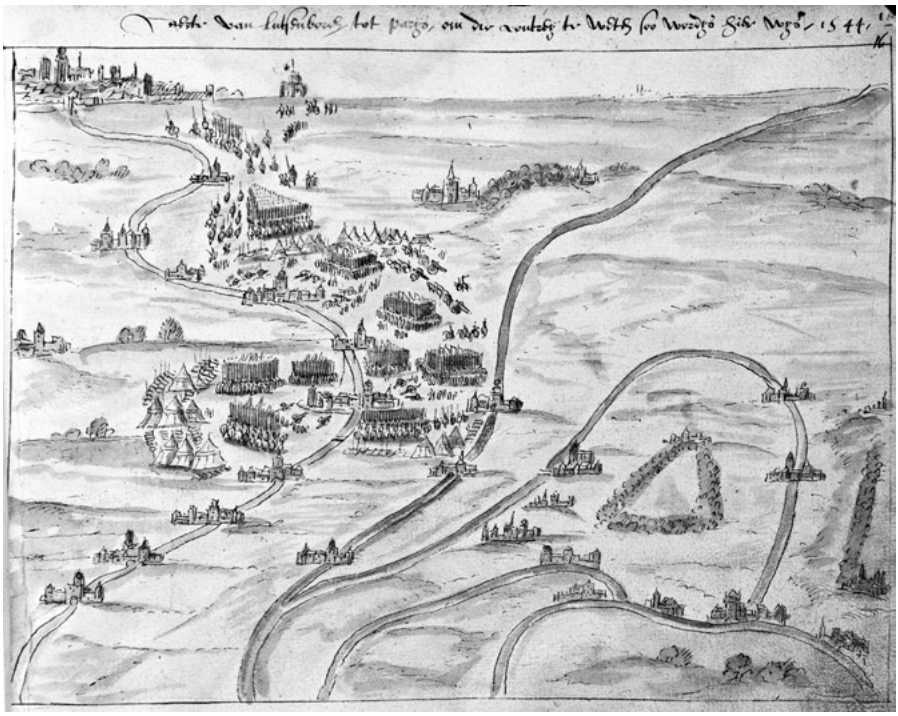

Figure 3. Itinerary from Luxemburg to Paris, 1544 (Brussels, KBR, MS 22089). Reproduced with permission of the Bibliothèque Royale de Belgique/Koninklijke Bibliotheek van België.

but might also refer to the forced conversion of Jews and Muslims.[22] The anonymous artist has also given the sea a very prominent place, as an obstacle that the pigs had to cross. The apparent paradox of the wilderness–garden terminology, an aspect of frontiers that will be referred to again later, is indeed that the very defence of a "garden," a territory, against wilderness, could also be based on wilderness elements. It is precisely this military perception of frontier landscapes that we will now examine.

Studying the ways armed forces perceived, and ultimately managed, frontiers might seem to be relatively straightforward. The political–military importance of these areas after all ensured a relatively strong interest on the part of rulers and/or states. It is in fact well known that peripheral areas, and frontiers in particular, were generally charted before a political entity's core regions.[23] The oldest maps from the Meuse Region, made with a military purpose in mind, date to the fifteenth century at least. Charles the Bold, Duke of Burgundy, paid painters in the 1460s, during his conflicts with the Prince-Bishopric of Liège, to make two maps: one of the frontier between the Duchy of Limburg and

22 van Winter, "De Hollandse Tuin," 82–87.

23 Dalché, "Les usages militaires"; Dauphant, *Le Royaume des quatre rivières*, 182–88; Desbrière, *Cartes et mémoires*, 5, 15–18, 22–25, 125–26; Hale, "Warfare and Cartography."

the Prince-Bishopric, and an itinerary, a road map, that connects *les pays de par deça* ("the lands over here" or the Burgundian possessions in the Low Countries) with *les pays de par dela* ("the lands over there" or the Duchy of Burgundy and Franche-Comté).[24]

The maps themselves do not seem to have been preserved, but it is possible to get an idea of what they might have looked like from a sixteenth-century map, now kept in the Royal Library in Brussels (see figure 3). This map, dating to 1544, depicts an itinerary from Luxemburg to Paris. It has to be read from the corner on the lower right to the one on the upper left. It was probably made in preparation for an actual invasion of France, given that Habsburg troops were actively fighting French forces at that time. The text on top says "Map from Luxemburg to Paris, to know the country so you will learn, 1544" (*Caerte van Lutsenborch tot Parijs, om die contreij te weten soo wordijs hier wijs, 1544*). While this map evidently used different conventions from military maps from the eighteenth and nineteenth century, it does show a clear emphasis on waterways and woodlands. These natural elements are depicted in a very schematic way, but it is still possible to identify the Meuse and Ardennes on the foreground.

Waterways and woodlands are in fact a prominent feature of all military maps, which were never meant to be realistic depictions of landscapes but guides to commanders on how to take advantage of them and avoid potential pitfalls. The eighteenth-century Ferraris map of the Southern Netherlands, named after the Habsburg engineer, the count de Ferraris (see figure 8), might appear to be more accurate than this medieval-looking map from 1544, but it still does not depict economic activities that were considered irrelevant for military commanders. In order to properly understand the assumptions and perceptions on which these maps are based, they have to be read in juxtaposition with the original written explanations that accompanied them, or with military handbooks. These sources confirm that military commanders saw woodlands and waterways as potentially dangerous environments, as obstacles to military movement, but also as potential aids to defence, as sources of fuel, and transportation routes.[25]

A far more important question than issues of accuracy or completeness is whether these maps actually reflect the perceptions of army members in general. Only a handful of higher-ranking officers and engineers had access to them. The information encompassed in these maps was not public; it constituted a carefully guarded secret.[26] While it is very unlikely that the average combatant was familiar with military maps, he still shared the same feelings towards woodlands, waterways, and other kinds of "wilderness" and expressed these sentiments in various kinds of tales and stories. John M. Collins actually made a connection between military perceptions of woodlands and fairy tales in his military geography handbook, as both depict woodlands as "dangerous." He

24 Paviot, "Les cartes et leur utilisation," 209–10, 213.

25 Brussels, KBR, Cartes et plans, MS IV 5.567: Carte de Ferraris; de la Fitte, *Mémoire militaire*; Desbrière, *Cartes et mémoires*, 32–33, 37–39, 41, 113; Despy, "Les opérations," 287–90; Graatsma, "Limburg 1802–1807"; Lemoine-Isabeau, *La Cartographie*, 141–43, 321–44.

26 Printed maps for instance were far less detailed than their manuscript versions. Lemoine-Isabeau, *Les militaires*, 67–72; Lemoine-Isabeau, *La cartographie*, 52–56; Schäfer, "'Krygsvernuftelingen'," 239–45.

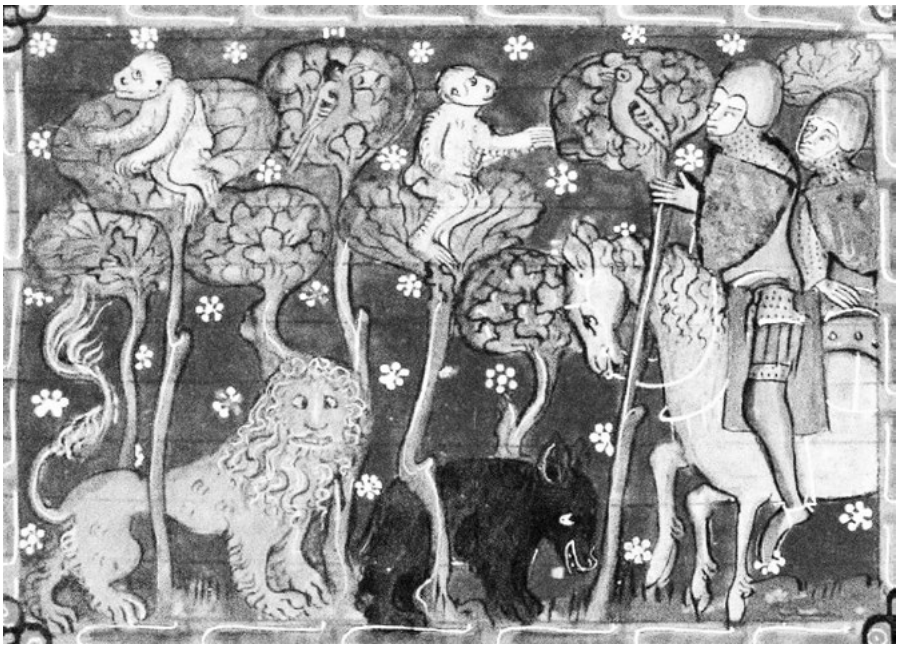

Figure 4. A knight errant enters a forest full of exotic animals, miniature from a Lancelot–Grail manuscript made in Tournai or Hainaut, mid-fourteenth century (Paris, BnF, MS français 122: *Lancelot Graal*, Piérart dou Tielt (atelier), 1344–45, fol. 180r).

intended this just as a joke, and failed to see that the connection between tales or sagas and armed forces is very real.[27] The average storyteller in premodern Europe was far more likely to be an adult male than the stereotypical "Mother Goose" character. The essential feature of a good narrator, aside from being able to speak fluently, was experience of travel. Soldiers and sailors therefore constituted a substantial group among such storytellers. The Brothers Grimm for instance paid J. F. Krause, a pensioned non-commissioned officer of the Saxon cavalry, because he was a famous storyteller, to obtain some typical soldiers' tales.[28]

The roots of these stories lay, at least partially, in the Middle Ages, and more specifically in chivalric romance (see figure 4). The tale of "Les Quatre Fils Aymon" or Renaud de Montauban and the horse Bayard, for example, can be dated to the twelfth century, and describes events that supposedly took place in the Ardennes during the reign of Charlemagne. It had a major role in contributing to the perception of the Ardennes as an impassable wilderness, and was still told in Lorraine during the eighteenth and nineteenth century with minor adaptions; the four knights had simply become soldiers.[29]

27 Collins, *Military Geography*, 41.

28 Bahro, "Afgedankte soldaten"; Fink, "The Fairy Tales"; Hopkin, *Soldier and Peasant*, 71–73, 108–24.

29 Hopkin, *Soldier and Peasant*, 221–36; Lejeune, "L'Ardenne," 69–72.

In a medieval context the actual narration was typically left to minstrels or heralds rather than combatants, but these storytellers also had a strong connection to warfare. Heralds accompanied armies on campaign to record events and identify noble participants. The herald Gelre for instance, the author of one of the most famous armorial books in medieval Europe, wrote a series of poems in which he praised the chivalric deeds of knights from the lands of the Meuse and Rhine.[30] Minstrels on the other hand had to raise the morale of the troops. The blacksmiths' guild of Liège, one of the most powerful associations in the city, enlisted two minstrels for life in 1403 to accompany them on military campaigns and processions.[31]

The *Rymkronyk* of Jan van Helen ("Heelu"), written in 1288–1290, which narrates the duke of Brabant's victory in the battle of Wörringen (1288) and the actions that led up to it, is another good example. It recites real events that happened relatively recently and is therefore not a fictional tale in the same way as the Romance d'Arthur or Lancelot's quest to find the Grail, but still draws on the same stereotypes. It claims in effect that when Duke Jan I of Brabant advanced through the Ardennes in the winter of 1286–1287 to besiege the fortified church of Sprimont, he rode through the "wildest lands of the German Empire."[32] The poet also added a very practical element, however, one that can also be found in later military descriptions: the Ardennes were considered inhospitable because invading forces found it difficult to procure sufficient amounts of food there (they were full of snow, and consisted of forests, mountains, and rocks). The duke, anticipating these problems, ordered his men to carry provisions with them on packhorses. The supposed impassability of the Ardennes, or indeed any other huge stretches of wilderness, was therefore connected to logistical issues.[33]

The Duke of Brabant's response to these supply problems deserves further scrutiny. It demonstrates that fast moving mounted forces were able to overcome most of the risks posed by these barren environments. Areas of wilderness certainly had their share of armed forces passing through. One just has to distinguish between huge invading forces and smaller armies with local bases to fall back on. Only the first category was relatively rare, at least when compared with more fertile lands, such as along the banks of the Meuse. The nobility of the lands between the Meuse and Rhine enjoyed a particular warlike reputation during the Central and Late Middle Ages, mainly because of their willingness to serve for pay or booty when an opportunity presented itself.[34]

30 De Boer, Faber, and van Gent, eds., *De rekeningen, 1393–1396*, lxi–lxii; van Anrooij, *Spiegel van ridderschap*; Verbij-Schillings, *Beeldvorming*, 224–32, 238–44.

31 de Chauvelays, "Les armées," 174, 176, 179, 206; Fairon, *Chartes*, 132–33; Mora-Dieu, "Les corporations," 200.

32 Jan van Helen uses the term *Oesselinc* or *Oesseninc* for the Ardennes, which might also be a reference to its wilderness character (*woest*). Goossens, *De geografie*, 10; Sleiderink, *De stem van de meester*, 87–97; van Helen, *Rymkronyk*, 100, 130–32.

33 Arnold, *Negotiating the Landscape*, 155–62, 216–18; Deniéport, ed., "Routes de terre et d'eau"; De Rabutin, *Commentaires*, 1:260–66; d'Haynin, *Mémoires*, 1:164 and 2:84–85; Kroener, *Les routes*, 59, 100; Muller, "Histoire militaire"; Vallée and Pariset, eds., *Carnet*, 7, 13, 217, 218, 229; Vilain, *Mémoires militaires*, 131.

34 Govaerts, "From Knight Errants to Disloyal Soldiers."

The main difference between these two kinds of forces can be demonstrated by taking the French invasion of the northern Meuse Region, in 1388, as an example. This expedition was directed against Guelders and Jülich and had to pass through the Ardennes, Hohes Venn, and Eifel. Despite the assembly of numerous wagons for this purpose, the chronicler Jean Froissart claims the army column measured no less than forty-five kilometres in length, logistical preparations would prove to be utterly inadequate in the face of difficult terrain, hostile inhabitants, adverse weather (incessant rains), and the cold climate. The size of this invasion force quickly became a liability rather than an asset: no fewer than three thousand labourers had to clear the roads between Virton and Neufchâteau in the Duchy of Luxemburg.[35] The famous French poet Eustache Deschamps served in this army, and later commented on his experiences in several ballads. One explictly warns against the dangers of a winter campaign, another complains about the money and horse he lost. The French army eventually accomplished its goal, the duke of Guelders and the count of Jülich signed a peace treaty, but the campaign was hardly the glorious victory the soldiers had expected. Many French noblemen were taken prisoner by their German counterparts, who were not hampered by these same environmental constraints, possibly because they knew the local terrain, and wore lighter armour.[36]

Given the predominance of large stretches of wilderness in the Meuse basin, such as the Campine/Kempen, Peel, Hohes Venn, Eifel, Ardennes, Woëvre, and Argonne, the use of the Meuse River as a symbolic frontier between the kingdom of France and the Holy Roman Empire might seem to be self evident. It should be stressed therefore that while the ecological characteristics of the Meuse Region have a significant role in explaining the political history of these lands, there is nothing predestined about the use of the Meuse as a frontier marker. This particular use, which has consequences to this very day, as the current basin of the Meuse River is divided among five states, is an accidental outcome of centuries of historical developments, in which political, economic, cultural, and military impacts were at least as important as ecological ones.[37]

During the Early Middle Ages the Meuse Region was in fact not a frontier at all. It constituted the core of the Carolingian Empire. The Carolingian dynasty came originally from the middle part of the Meuse basin, more precisely from Hesbaye, the fertile lands to the north of Liège. Names such as Pepin of Landen and Pepin of Herstal are very revealing in this regard. Charlemagne also established his empire's capital in Aachen. This does not diminish that contemporaries already perceived the Ardennes as a wilderness. The main point is that in the Early Middle Ages an area such as the Ardennes could become the core of an empire despite its apparent wilderness character. Charlemagne

35 Froissart, *Chroniques*, 13:196–98; Laurent and Quicke, *L'Accession*, 220–53; Moulin and Pauly, *Die Rechnungsbücher*, 1:38–42.

36 Deschamps, *Oeuvres*, 1:123–24, 3:24–26, 5:121–22; Laurent and Quicke, *L'Accession*, 220–53; Le Bouvier, *Le livre*, 113.

37 On the use of woodlands as frontier markers see Bechmann, *Trees and Man*, 259–62; Dubois and Renard, "Forêts et frontières," 29–34; Higounet, "Les grandes haies forestières."

liked to hunt in the Ardennes and might actually have killed some of the last aurochs living in Western Europe.[38]

The wilderness aspects of large areas of the Meuse Region became relevant in the specific context of the division of the Carolingian Empire. It is hardly a coincidence that the two major agreements that settled disputes over this inheritance came about in the Meuse Region: the treaties of Verdun (843) and Meerssen (870). It is particularly as a result of the latter treaty that most of the Meuse Region, which had become part of Lothair I's Empire, was incorporated into the eastern half of Charlemagne's former imperium.[39] The Meuse only served as a limit between what later became the kingdom of France and the Holy Roman Empire in Champagne and the Argonne. Further north the Scheldt replaced it as the official dividing line. Even in these southern areas, the importance of the Meuse River can be called into question. A list of testimonies, assembled in 1288 on request of emperor Rudolf of Habsburg (1273–1291), regarding the exact limits of the Empire in the Argonne, demonstrate that not the Meuse, but a small river, the Biesme, a tributary of the Aisne, served as the actual boundary marker.[40]

The gathering of these testimonies reflects the emperor's growing discomfort with French expansion towards the east. It is precisely in the late thirteenth century that the kings of France incorporated the Meuse River into a discourse that presented their kingdom as delineated by four rivers (the Meuse, the Saône, the Rhône and the Scheldt). The year 1301 was a crucial turning point, for Count Henry III of Bar (1291–1302), whose county lay on both banks of the Meuse River, had to acknowledge Philip the Fair (1285–1314) as his overlord for "Bar non-mouvant," more or less the part of his county located on the left (western) river bank. This made him a fiefholder of both king and emperor, whereas until this point the entire principality had been part of the Empire. In other words, the Meuse River became a dividing line because of European politics in the Central Middle Ages. This still did not turn the river into a real frontier, however, since the County of Bar still occupied both riverbanks. The Meuse only served as a frontline in the 1420s, when troops loyal to Henry VI (King of France, 1422–1453) occupied almost the entire kingdom of France north of the Loire River. Partisans of Charles VII (King of France, 1422–1461) only held out in a handful of fortresses east of the Meuse River: in other words, in the Holy Roman Empire. It is in this specific context that Jeanne d'Arc, born in Domrémy, on the left bank of the Meuse River, rose to prominence.[41]

The example of the County of Bar refers to a fundamental aspect of the distinctions between the Meuse's symbolic and practical value as a frontier marker. During the Middle Ages, the ways in which the various principalities that actually composed "France" and the "Holy Roman Empire" interacted with each other and drew boundaries were often more important than perceived boundaries between these larger entities. Most

38 Arnold, *Negotiating the Landscape*; Müller-Kehlen, *Die Ardennen*, 109–10; Rousseau, "La Meuse," 49–64; Suttor, *La Meuse*, 221–37.

39 Pettiau, "Un espace frontalier"; Suttor, *La Meuse*, 231–37.

40 Aimond, *Les relations*, 54–69; Havet, *La Frontière d'Empire dans l'Argonne*, 22, 26–27, 37. See also Kraemer, "Une carte chorographique," 219–24.

41 Dauphant, *Le Royaume des quatre rivières*, 121–22; Toureille, *Robert de Sarrebrück*, 78–86.

of these smaller principalities straddled both riverbanks (see map 2). The Meuse River only served as a frontier along rather small stretches of its course: in 1250 between Namur and Luxemburg near Poilvache, between Namur and Liège from Andenne until Huy, and between Loon and Brabant on the one hand and Guelders on the other around Stokkem and Maaseik and Oss and Cuijk. In some of these areas copper boundary poles were put in the Meuse during the Late Middle Ages. Processes of political amalgamation reduced its role as a dividing line even further (see map 3). Today, it only serves as a border between the Dutch and Belgian provinces of Limburg (see map 1).[42]

The limited role of the Meuse as a frontier marker can be explained by drawing attention to its economic importance. The river was one of the main transport routes in Western Europe since at least Late Antiquity, especially for large volume goods such as wood, metal, or stone. Such traffic inevitably led to attempts to control trade networks and extract income (for instance, tolls). Military transportation also had to rely on rivers because moving artillery or large quantities of food and ammunition over land was a very laborious task. The detailed accounts of the fifteenth-century Burgundian administration make it clear that the transportation of the heaviest guns, which could easily weigh two tons, necessitated the use of specially reinforced wagons drawn by over thirty horses. Their ammunition, specially extracted stone or cast iron balls, had to be carried along in wagons that also required more horses than usual: a wagon carrying twelve bullets needed nine horses instead of the usual three or four. Charles the Bold had to mobilize almost three thousand horses to transport his artillery (one hundred and twelve guns) and associated material during the 1473 campaign against Guelders.[43]

There were in effect many drawbacks to land transport: it was slow and cumbersome, and the horses and wagoners needed to be fed and paid. When the dukes of Burgundy assembled their armies they did so preferably near waterways: Mézières in 1465, Namur in 1466, and Maastricht in 1473. Transporting artillery over water does require, however, that a commander controls both riverbanks, or at the very least that his boats do not have to pass through hostile territory. Artillery became more standardized from the sixteenth century onwards and consequently easier to handle, but during this entire research-period sieges required relatively large amounts of heavy artillery (e.g., twenty-four pounder guns, howitzers, and mortars instead of twelve or six pounders), which had to be specifically brought up for that purpose.[44] Dutch military treatises from the early seventeenth century indicate that the transportation of sixty-seven tons of ammunition required either one hundred thirty five wagons or five boats. It is indeed revealing that a plan of the French engineer Filley to block an Allied advance towards Dinant in

42 Dauphant, *Le Royaume des quatre rivières*, 127–28; Panhuysen, "De politieke verhoudingen"; Suttor, "Le rôle d'un fleuve," 361–64.

43 Decuyper, "De Bourgondische artillerie," 218–27; Douglas Smith and DeVries, *The Artillery*, 48–49, 112, 351–52, 208–9; Sommé, "L'Artillerie"; Suttor, *La Meuse*, 444–46.

44 Decuyper, "De Bourgondische artillerie," 221–27; Harari, "Strategy and Supply"; Marchal, *Inventaire*, 135; Naulet, *L'Artillerie*, 186–212.

1695 by constructing a dam in the Meuse was never executed because it also made a French counterattack towards Namur impossible.[45]

The use of the Meuse River for transporting troops and their horses was far less important, because marching over land was faster and easier. The militias of cities located next to the Meuse made frequent use of river transport, but the actual number of troops could be as low as a dozen.[46] The accounts of Venlo from 1412 specify, for instance, that it paid for the transportation of about fifty men on two *baardsen* to Batenburg, a fortress located between Lith and Grave. A *baardse* was a relatively shallow and small ship, which made it ideal for navigating rivers as well as carrying out military expeditions on the North Sea. In the medieval County of Holland the use of ships, cogs as well as *baardsen*, during military campaigns was so conventional that the number of people that each settlement had to supply was measured in oars (similar arrangements existed in Scandinavia and Scotland).[47]

River transport remained a distinct possibility well into the early modern period as long as the navigability of the Meuse itself allowed it.[48] A temporary drop in the water level, or conversely, a sudden flood, made it impossible for boats to pass through. Even in the best of circumstances the river could only be navigated from Commercy onwards. Commercial traffic was only possible between Sedan to the North Sea. The Freiherr von Natzmer (1654–1739), a former officer of the Dutch army, remembered in his memoirs how the low water level of the Meuse significantly complicated their retreat from Maastricht in 1676, since the sick and wounded, as well as the cannons, could not be transported by water.[49] The construction of new forts at Stevensweert (near Maaseik) and Navagne (near Visé) by the Habsburg government in respectively 1633 and 1634 also attempted to secure traffic over the Meuse after the Dutch conquest of Maastricht.[50]

Throughout these six centuries many rulers tried to reunite the entire Meuse Region, and several of them could claim to have been temporarily successful. Any of these actions could, potentially, have led to the unification of the region under one political entity. Charles the Bold (1467–1477), for example, made major efforts to restore Lothair's former empire (855–869) and effectively controlled almost the entire northern half of the Meuse Region by the early 1470s. He died at the battle of Nancy while fighting for control over the southern half. Charles V (1506–1555) again united a considerable part of the region, by occupying the Duchy of Guelders, but the Dutch Revolt caused a renewed separation. The armies of Louis XIV (1643–1715) seized large stretches of the Meuse basin, even taking Maastricht in 1673, yet eventually had to abandon many of their conquests.

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45 Muller, "Les gués"; Wijn, *Het krijgswezen*, 388.

46 Burgers and Dijkhof, eds., *De oudste stadsrekeningen*, 23, 43–44, 65, 71; Suttor, *La Meuse*, 463–64; Waale, *De Arkelse oorlog*, 118; van Helen, *Rymkronyk*, 116.

47 de Groot, *De stadsrekeningen*, 1405 fols. 14–16, 1407 fols. 18, 22, 1412 fols. 18, 44; Fritze and Krause, *Seekriege*, 57–58: Jansen and Hoppenbrouwers, "Heervaart in Holland."

48 Helmich, *Journaal*, 230, 232; Kroener, *Les routes*, 92–93; Suttor, *La Meuse*, 464–65.

49 von Adlersfels-Ballestrem, ed., *Memoiren*, 24–25.

50 Sangers and Simons, *Geschiedenis*, 82–83; van Hoof and Ramakers, "De militair-strategische betekenis," xxix.

Napoleon I (1804–1814) ruled over the entire Meuse Region after the incorporation of the kingdom of Holland into the French Empire (1810) until his abdication caused renewed divisions. The Meuse Region might have been percieved as a symbolic frontier since the Early Middle Ages, but it only became a real one as a result of specific political events.

Managing Frontiers

Armed forces' perception of frontier landscapes was to a large degree based on the garden–wilderness dichotomy, which reflects the basic fact that armies operating in the Meuse Region came from societies that depended on agriculture for their survival. This agrarian origin also had a major influence on the ways armed forces actually operated in frontier landscapes. Let us first analyze the core of frontier strategies: concentrated defence (strongholds) versus drawn-out linear fortifications. Both options had their value and limitations. The choice for one or the other can therefore be used to gain insight into the nature of the perceived threat, the "other" standing on the opposite side of the frontier.

Fortresses control their surrounding territory, not only through their strategic location, but also by operating as a seat of government. A classic example is the city of 's-Hertogenbosch, founded at the end of the twelfth century in what was originally a forested area (the name literally means the Duke's Forest). This city functioned as the centre of the northern part of the duchy of Brabant; the Meierij of 's-Hertogenbosch. When the Dutch captured the city in 1629 they could therefore lay claim to the entire district. It was also a key stronghold in the defence of the Meuse River, first for the dukes of Brabant and later for the Dutch Republic.[51]

The city of 's-Hertogenbosch was only one of many new towns founded in the Central Middle Ages with strategic considerations in mind. Rulers throughout the Meuse Region granted charters of liberties and urban rights for similar purposes to settlements as Geertruidenberg, Nieuwstad, Stokkem, Montmédy-Haut, and Marville. Villagers typically received such privileges in the expectation that they would defend a ruler's fortress or to consolidate the frontier more generally.[52] The main difference between these medieval towns and their sixteenth- and seventeenth-century counterparts (Mariembourg, Rocroi, Philippeville, Willemstad, Stevensweert, Charleroi, and Longwy) is that armies, and more particularly soldiers, often had an active role in the latter's construction, a reflection of processes of state formation. Another noteworthy characteristic is the concentration of these early modern defences around the Meuse River where it enters the inhospitable landscapes of Marche-en-Famenne and the Ardennes. This part of the Meuse Region became especially important as a corridor within the context of the Habsburg–Valois rivalry in the 1540s and 1550s.[53]

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51 De Cauwer, *Tranen van bloed*, 143, 261–63; Deprez, "La politique castrale."

52 Aarts and Hermans, "Castle Building," 17–18; Berens, *Territoriale Entwicklung & Grenzbildung*, 125, 137; Reichert, *Landesherrschaft*, 2:585, 2:609–10, 2:615; Yante, "Franchises, paysages et environnement," 134.

53 Gaber, "Marville et l'espace frontalier"; Hasquin, *Une mutation, le "Pays de Charleroi"*, 18–23,

While these fortresses did control strategic access points, they were still unable to defend a "frontline" on their own. Only in exceptional cases were rival strongholds built so close to each other that one might speak of a true frontier in the sense of a frontline. The best example is the long-standing rivalry between Bouvignes and Dinant with the destruction of Dinant by Burgundian forces (1466) as a notorious climax. The town of Bouvignes, in the County of Namur, was founded in the twelfth century as a counterpart to Dinant, in the Prince-Bishopric of Liège, on the opposite (left) bank of the Meuse River. Copper boundary poles were put into the river to demarcate their respective territories, and by 1465 the cities' respective fortifications had been expanded to such an extent that gunners could actually target their adversary's defences.[54]

The example of Bergeijk, in the Campine/Kempen on the Brabant–Loon frontier, on the other hand, might be more typical for most frontiers within the Meuse Region. Of particular interest is a charter from 1415, written down in the context of a local boundary dispute. Such disagreements invariably involved witness testimonies of the oldest members of a village. In this charter villagers of Pelt (Overpelt and Neerpelt) declared that several decades earlier, possibly in 1334, an official of the count of Loon wanted to burn neighbouring Bergeijk in retaliation for a Brabant attack on the count's town of Beringen. The villagers managed to convince him not to do so by pointing out that the count also owned twelve manors in the district. Apparently, a fixed boundary had not yet been established in the heathlands of the Brabant–Loon frontier. The inhabitants of Bergeijk again narrowly avoided a raid in 1388, when they persuaded the duke of Guelders that their lands depended on both Brabant and Liège. That very same year the councillors of Theux wrote down an agreement between the inhabitants of the lordship of Franchimont in the Prince-Bishopric of Liège, and those of the Duchy of Limburg. It stated that livestock could graze on the common land from sunrise to sundown and that, if one of the principalities was involved in an armed conflict, villagers could pasture their animals on the lands of the other side.[55]

The aforementioned charters demonstrate that medieval principalities were assemblies of lands over which a ruler could claim some right (notably taxation or justice). Power was not exerted uniformly across the whole territory.[56] Over time general boundaries did of course become more clearly defined, but it is illuminating that even in the late eighteenth century, when the Ferraris map was drawn, major issues regarding the exact location of the borders between the Austrian Netherlands and the Prince-Bishopric of Liège still remained unsolved. The gunners who made this map went to considerable trouble to denote enclaves and contested boundaries.[57]

The awareness that premodern frontiers could assume the shape of both zones and actual frontlines is crucial for understanding how armed forces interacted with frontier

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251–53; Sangers and Simons, *Er ligt een eiland in de Maas*, 82–83, 244–51; van den Eynde, "La fonction militaire"; van Nispen, *Willemstad*, 25–33.

54 Borgnet, *Bouvignes*; Bormans, Lahaye, and Brouwers, ed., *Cartulaire de Dinant*, 2:103–10.

55 Bormans, "Chambre des Finances," 20–21; Vangheluwe, "Bergeijk," 309–24.

56 Chouquer, *Traité d'archéogéographie*, 23–38; Genicot, "Ligne et zone"; Noordzij, *Gelre*, chapters 3–4.

57 Brussels, KBR, Cartes et plans, MS IV 5.567: Carte de Ferraris.

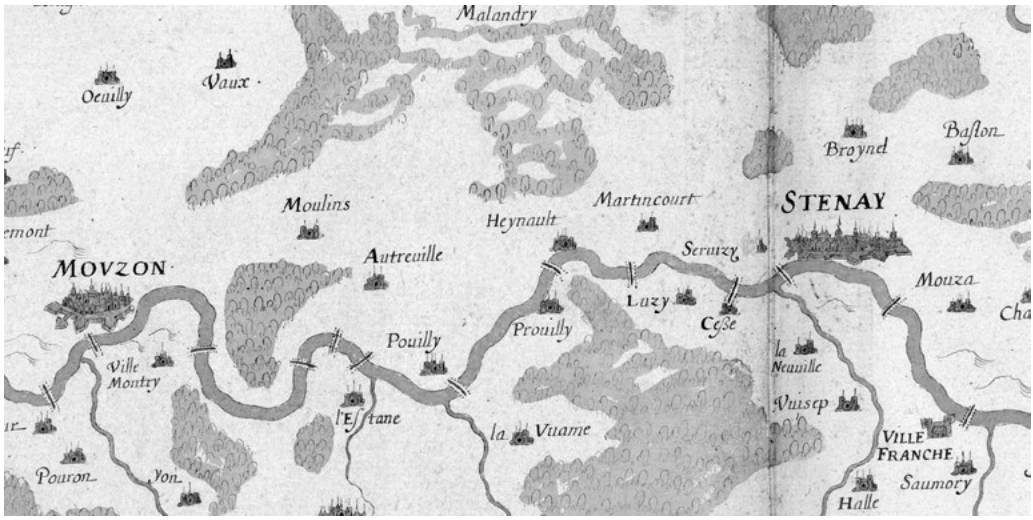

Figure 5. Detail of a map depicting fords in the Meuse River from Saint-Mihiel to Revin, 1640 (Paris, BnF, Cartes et plans, GE BB–246 (IX, 128–129 *Partie du cours de la Meuse avec les guez sur icelle*)).

landscapes. Many armies, especially up to the early eighteenth century, simply intended to raid and devastate, or otherwise extract income from enemy lands (contributions), rather than to occupy territory. Revealing in this regard is a treaty from 1707, signed by representatives of the French king and the Dutch Republic. The French government agreed to pay contributions and not to raid the land of Cleves, and in return the Dutch would not invade the lands to the west of the Meuse River with a force of fewer than four thousand men. In other words, in 1707 a force of four thousand men was accepted as a dividing line between an army bent on establishing contributions and one able to occupy territory.[58]

When the French engineer de Vauban devised his famous "iron belt" (*frontière de fer*) in the late seventeenth century, two lines of fortresses along the frontiers of Louis XIV's kingdom, he left a gap between the Meuse River on the one hand and the Moselle and the Rhine on the other. In this area it was assumed that the Ardennes, a "natural frontier," constituted an adequate barrier. As the treaty from 1707 demonstrates, this defence system deterred only large invasion forces, not fast-moving bands of mounted raiders. From 1644 to 1748 the French monarchy thus had to construct special defensive lines on the Meuse and Semois rivers to cope with this threat.[59]

These linear defences deserve closer attention because they show the difficulty of using the Meuse, or any other river, as an obstacle. The French government connected major strongholds (Mézières, Sedan, Mouzon, and Stenay) to each other through the

58 Desbrière, *Chronique critique*, 128–31, 136.

59 Desbrière, *Chronique critique*; Parker, *The Army of Flanders*, 11; Satterfield, *Princes, Posts and Partisans*, 86–88.

garrisoning of medieval fortresses along the Meuse, and the creation of new watchtowers and earthen embankments (redoubts) near fording places. Soldiers of the royal army concentrated in the former points of defence, while guarding the latter linear defences became the responsibility of thousands of armed peasants, drawn from the lands between the Meuse and Aisne. The costs of this defence were manifold: it drained manpower from the regular army, removed peasants from their work, and consumed massive amounts of timber. A surviving report from 1710 indicates that the construction of a single redoubt required one hundred and twenty-eight *fascines* (bundles of branches) and two hundred and fifty pallisades. Yet these lines rarely succeed in keeping well-organized raiders at bay.[60]

The character of the Meuse River itself lay at the heart of the difficulties: depending on the season multiple fords could appear or disappear, and each had to be fortified (see figure 5). This unpredictable behaviour also lowered the life expectancy of earthen fortifications considerably: the seasonal flooding of the Meuse ensured that if these redoubts were not properly maintained they became completely unusable in a few years due to erosion. Yet worst of all was that despite these defensive efforts enemy forces crossed the Meuse River anyhow, either because armed peasants could do little to oppose them, or because they found other ways to get across, by using boats or swimming. The French government responded to these issues by establishing a different defensive line, on the Semois, a tributary of the Meuse, and by increasing the number of guards. M. de Lagrange, *lieutenant de roi* in Rocroi, even ordered the cutting of wood alongside the main road from Sedan to Bouillon in 1701 so that enemy troops could be spotted more easily.[61]

The problems faced by French generals were hardly unique, as every effort to defend the Meuse River faced the same difficulties: 's-Hertogenbosch depended on temporary fortifications (*blokhuizen*) and patrolling by boat to fend off attacks from Guelders in the fifteenth and sixteenth century, and Imperial troops constructed earthen redoubts to defend themselves against Belgian rebels on the west bank of the Meuse in 1789–1790. Such defensive efforts could be hampered by harsh winters, when invading forces could simply walk over the frozen Meuse, as well as dry summer months (see figure 30).[62] The Duke of Alba's attempt to keep William of Orange on the east bank of the Meuse River in 1568 famously failed when the prince's army found a ford in the Meuse between Stokkem and Obbicht on the night of October 5 to 6. Credit for this operation probably has to go to Karel van Bronckhorst, lord of Obbicht, who fought with the rebel army. In order to prevent surprises such as this, Michel de Warisoul, castellan of Samson, sent a report in September 1568 to the count of Berlaymont, stadtholder of Namur, listing all possible

60 Desbrière, *Chronique critique*; Desbrière, "Le bois," 243–47, 249.

61 Desbrière, *Chronique critique*, 21–22, 29, 34, 44, 90–91, 110, 117, 227; Richer, *Abrégé chronologique*, 220–94.

62 Adriaenssen, *Staatsvormend geweld*, 44; de Clercq, "Jean-Baptiste De Bouge," 207–52; Deloffre, "Guerres et brigandages," 352, 391; De Stavelot, *Chronique*, 101–2; Sabron, *De oorlog*, 2:125, 2:126, 2:159, 2:163; Terlinden, *Les souvenirs historiques*, 74–76; van Hoof and Ramakers, "De militair-strategische betekenis," xxvii–xxviii; Vilain, *Mémoires militaires*, 67; van Zuijlen, *Inventaris*, 1:497; von Adlersfels-Ballestrem, ed., *Memoiren*, 89; Waale, *De Arkelse oorlog*, 126.

crossing points between Dinant and Huy, including suitability for cavalry, infantry, and wagons. There were no fewer than thirty-one.[63]

This concern with potential routes in the Meuse River is representative for a more general friction between road networks and the conservation of wilderness. Frontiers were landscapes characterized by the threat of a potential enemy attack. The standard response to an invasion was blocking the invader's road of advance. Depending on local landscape features this could entail the obstruction of routes with cut down trees (*abatis*) and ditches, the destruction of bridges, and the obstruction of river traffic with stakes or palisades. In 1422, for instance, the forester of Hainaut's lieutenant led his wardens and an unspecified number of labourers into the Forêt de Mormal to block roads with cut down trees and destroy bridges so that enemy troops would not be able to pass through. They needed thirteen days to complete this task.[64] Contemporaries thus not only perceived wilderness as dangerous because of its inherent nature, but also because these landscapes were far more likely to serve as hostile environments during armed conflicts.

Such needs could outweigh economic ones, creating certain tensions. In 1488, during the siege of the castle of Namur, which was built adjacent to the confluence of the Sambre and Meuse, the besiegers blocked traffic on both rivers by putting chains between the pillars of an existing bridge over the Meuse, constructing a temporary wooden bridge over the Sambre, and placing a large floating barrel on the Meuse near one the artillery towers in the city wall. The creation of two separate barriers across the Meuse was necessary to close off the river before and after its junction with the Sambre (see figure 8).[65] The city of Maastricht (from the Roman "Mosa Trajectum" or bridge over the Meuse/Maas) likewise assumed considerable strategic importance because of its location on a major Roman road, connecting Bavay to Cologne, and its control over one of the few stone bridges over the river. Maastricht retained its military value from the fourth century CE, when the Roman army built a fort there, until its demilitarization in 1868.

Most roads in the Meuse Region, as elsewhere in Western Europe, were tracks leading from one settlement to the next. A 1632 handbook for the *maréchal des logis*, the officer in charge of billeting troops, depicts a variety of local road networks.[66] The state of such paths, filled with mud piles and holes, and rarely designed to accommodate any movements beyond local traffic, obviously left much to be desired.[67] Officers of the

63 Brouwers, "Les gués"; de Graaf, *Oorlog*, 243; Sangers and Simons, *Geschiedenis*, 67.

64 Delcourte Debarre, "Espaces forestiers," 320, 342. See also Becquet, "Montaigle," 108–9; Burgers, "De steden van Holland," 277; de Robaulx de Soumoy, "Recherches," 184–85; de Stavelot, *Chronique*, 365.

65 Borgnet, "Troubles," 35, 45–50.

66 De Solemne, *La charge du mareschal des logis*; Duyck, *Journaal*, 3:395; Mourroux, "Stenay, ville militaire," 50–51; Parker, *The Army of Flanders*, 72–74; Richer, *Abrégé chronologique*, 183; van Hoof and Ramakers, "De militair-strategische betekenis."

67 Brunner, ed., *Reise des P. Reginbald Möhner*, 54, 101–2; d'Haynin, *Mémoires*, 1:139, 1:216; Douxchamps-Lefèvre, *Inventaire*, 3:268; Felsenhart, "L'invasion," 306, 311; Hagendorf, *Tagebuch*, 62; Lidec, ed., "Routes de terre et d'eau," 50–54; Vallée and Pariset, eds., *Carnet*, 108, 122; van Werveke, *Die Erwerbung*, 38.

bishop of Liège's army, for example, complained in April 1756 about soldiers losing their shoes in the mud when chasing vagrants in the Campine/Kempen (see chap. 4). They explicitly stated that the roads were impracticable for a military unit.[68]

Given that building high-quality paved roads rarely became a viable option before the eighteenth century, relatively few solutions were available to solve these problems. Accounts from the village of Chatelineau, near Charleroi, show that during the seventeenth century the villagers regularly procured hundreds of *fascines* to lay on local tracks.[69] In several of these instances, it is clear that these efforts were, directly or indirectly, stimulated by armed forces passing through. The main alternatives to not improving the tracks would be that the soldiers stayed longer in the area or were diverted from the tracks and trampled agricultural land in the process. Many legal acts or court records of war-related damage speak of armies cutting down hedges and damaging agricultural fields when passing through.[70]

While armed forces complained regularly about the state of the road network, they also contributed to road degradation themselves. In 1665, for example, a new regional road connecting Liège and Sedan (*le Chemin Neuf*) was finished. This road had considerable economic value because it did not have to pass through the Spanish Netherlands. It thus allowed traders to avoid potential conflicts between the French and Habsburg monarchies, economic or otherwise. But French forces also took advantage of this new route to invade the Meuse valley in 1667–1668, and effectively rendered the road unusable until repairs could be carried out.[71]

Armies ultimately responded to the constraints on movement posed by land roads as well as rivers, such as the Meuse, by constructing canals (and later railways as well). Canals provided a relatively easy, and economical, way of transportation, just as rivers did, but their straight outline and constant water level made them much more reliable in terms of navigation. Of no less importance is that these same characteristics also made them much easier to defend. What we see here is a combination of military and economic goals, or at least the assumption that military and economic objectives can be complementary, in a way that resembles military concern with horse supply (see chap. 4). The Fossa Eugeniana (1626–1633) and the Canal du Nord (1806–1810) for example, both of which were never finished, aimed to divert traffic from the Meuse and Rhine Basins, and therefore the Northern Netherlands, towards the Scheldt Basin (favouring Antwerp). Yet at the same time these canals constituted a military defence line, a potential frontier. This is especially obvious in the Fossa Eugeniana because intermediate forts were built to defend this canal, and soldiers had an active role in its construction. The Zuid-Willemsvaart (built in 1822–1826), on the other hand, ran parallel to the

68 Liège, AEL, Etats, inv. no. 2974: Petition April 10, 1756.

69 Kaisin, *Annales historiques de la commune de Chatelineau*, 125, 127, 154, 345.

70 Caffiaux, *Essai sur le régime*, 272–73; Douxchamps-Lefèvre, *Inventaire*, 3:283; Driessen, *Emundt van Oeteren*, 347, 702; Illaire et al., eds., *Les cahiers de doléances*, 210; Jacob, *Bruyères*, 181; Lambert, "Des témoins," 195; Laurent and Quicke, *L'Accession*, 229; Mertens, "Bank van Pelt," 23; Sabron, *De oorlog*, 2:25; van Heiningen, *Tussen Maas en Waal*, 282–87.

71 Harsin, "Etudes sur l'histoire économique," 89–95. See also Mengels, *Chronyk*, 45–46.

Meuse River and created a relatively swift and reliable transportation route between the strongholds of 's-Hertogenbosch and Maastricht.[72]

Such waterways might seem the perfect alternative for the relatively unpredictable Meuse River, but they created problems of their own. Canals drain water from surrounding areas, especially the rivers they are connected with, and in this way make the latter even more difficult to navigate. In 1460, for example, the citizens of 's-Hertogenbosch dug a canal near the fortress of Nederhemert, on the frontier of Brabant and Guelders, between two arms of the Meuse River. Creating this new watercourse isolated the aforementioned fortress, a fief of the duke of Guelders, but it also served to avoid Heusden's toll stations. The town council of Heusden continued to protest that it made the Meuse impassable in inquests of 1494 and 1514. Communities obviously wanted to convince their ruler that the tax burden should be reduced, but that does not mean that the grievances put forward in such documents were unfounded.[73]

The complaints of the council of Heusden can be seen as emblematic for environmental problems near the Meuse estuary. Both Rotterdam and Dordrecht in the Middle Ages had almost direct access to the sea. By the sixteenth century processes of land reclamation and the silting up of significant parts of the Meuse had made this contact increasingly problematic. Defence of the sea, "the most important frontier of the republic," rested mainly on warships, but it was precisely these ships that found it increasingly difficult to navigate the Meuse estuary.[74] Such problems were not just the result of ecological processes; they were aggravated by an increasing divergence between warships and other vessels during the seventeenth century. The pressing need to carry more guns, symbolized by the adoption of so-called ships of the line, necessitated the creation of larger vessels.[75] The Admiralty of the Meuse, tasked with defending the Meuse estuary, therefore had to turn the small town of Den Briel into its main harbour, which was connected by the "Brielse Maas" to the main or Old Meuse in 1607. By 1650 even this forward post had to be replaced by new docks in Willemstad and Hellevoetsluis.[76]

Armies valued wilderness because it served as a barrier, but at the same time its very naturalness made movements, especially counterattacks or offensive strategies, problematic. Rather than adopting an entirely defensive attitude towards frontiers, or abandoning wilderness as protective elements, armed forces ultimately came to their own unique solutions to solve the tension between road networks and wilderness,

72 Plans to connect the Oise to the Sambre or the Meuse to the Moselle were never executed, however. Blanchard, *Les ingénieurs*, 453–54; de la Fitte, *Mémoire militaire*, 101–8; Desbrière, *Cartes et mémoires*, 45; Filarski, *Kanalen*, 117–20, 296–97; Guillery, *La Meuse*, 6–7; Harsin, "Les projets"; Martin, "Maastricht," 115–21, 177–84; Pistor and Smeets, *Die Fossa Eugeniana*; Rowlands, "Moving Mars," 492–507; van der Woud, *Het lege land*, 108–30, 490–91.

73 *Enqueste ende informatie (1494)*, 196; *Informacie up de staet faculteyt ende gelegentheyt*, 433; Hoeckx et al., eds., *Kroniek van Molius*, 118–19.

74 Krayenhoff van de Leur, *Militair-historische schetsen*, 89–92. de Jong, *"Staat van oorlog"*, 65; Denessen, "Twee havenuitdiepings-projecten; van Hoof, "De kustverdediging."

75 Bruijn, *Varend verleden*, 81–84, 92, 95–97, 102–3, 184–85, 216.

76 Don and Voorne-Putten, 58–59, 67–74; Filarski, *Kanalen*, 52–54; 80–81; van Mastrigt, *Willemstad prinsheerlijk*, 48–53, 91–92, 101–4.

movement, and blockades: they created their own artificial "wilderness." The most famous example of such an attempt is the Hollandic (or Dutch) Water Line.

The term Hollandic Water Line refers to a series of inundations intended to safeguard the core of the Dutch Republic, the County of Holland, if an attacker managed to invade the country. In effect it gave new meaning to the image of the *Hollandsche Tuyn*. Its basic conception originated in the desperate year 1672, when French and Münster troops overran large parts of the republic. It was only later that Dutch engineers developed a more complicated system of sluices and access dikes that allowed commanders to inundate specific areas and defend a handful of access points. The essential aspect of this Hollandic Water Line, or Lines, for one should distinguish between the Old (1672–1795) and New Hollandic Water Line (1815–1956), was therefore that large stretches of land had to be prepared for a potential inundation but were not flooded permanently. Their long-term ecological significance, which continues to this very day, lays in the preservation of large wetlands or marshes that would otherwise have been drained and turned into agricultural fields, rather than the handful of years the lands were actually flooded.[77]

The French government by contrast adopted its own equivalent of the Hollandic Water Line, based on the preservation of woodlands near frontiers. This policy developed only gradually. The marquis de Langeron, a French general, left an account of an inspection tour along the French frontiers in 1773–1774, meant as an educational opportunity for his young son, on how to follow in his father's footsteps. When he passed near the Forêt de Mormal he remarked that it is a good thing that the count de Nicolaï, marshal of France, prevented the *grand maître des eaux et forets* from constructing a major road through these woodlands. It would have facilitated an enemy invasion.[78]

In 1776 the king of France passed an official regulation, which gave military engineers far-reaching powers to prevent anyone from creating new routes in frontier zones, which included the entire French-controlled part of the Meuse Region, without the approval of a special commission (*la Commission mixte des travaux publics*), dominated by military engineers. Given that any significant clearing of woodlands created a potential invasion route, the French military had a primordial role in the preservation of forest belts alongside France's borders, which are clearly observable even today. These landscapes, symbols of European "wilderness," are the result of a deliberate policy based on military perceptions of frontiers that date back to the Middle Ages at the very least.[79]

Up till this point we have considered frontier landscapes in terms of access, and more particularly defence against a potential enemy attack. Armies' interactions with frontier landscapes also included a set of impacts, however, that were not directly related to defensive needs, and might occasionally even run contrary to them. These will be referred to as "garrison services" because of their vital role in sustaining a military pres-

77 Bevaart, *Nederlandse defensie*, 71–76; 96–101; Caminada-Voorham, *Loevestein*, 109–11, 126–28; Ridderbos, *Kleine atlas*, 80–87; Will, *Sterk water*, 29–63.

78 Vallée, "Le journal," 168–69.

79 *Ordonnance Corps du Génie (1776)*, 30–31, 43; Dubois, "Les forêts"; Reitel, "Le rôle de l'armée," 143–48.

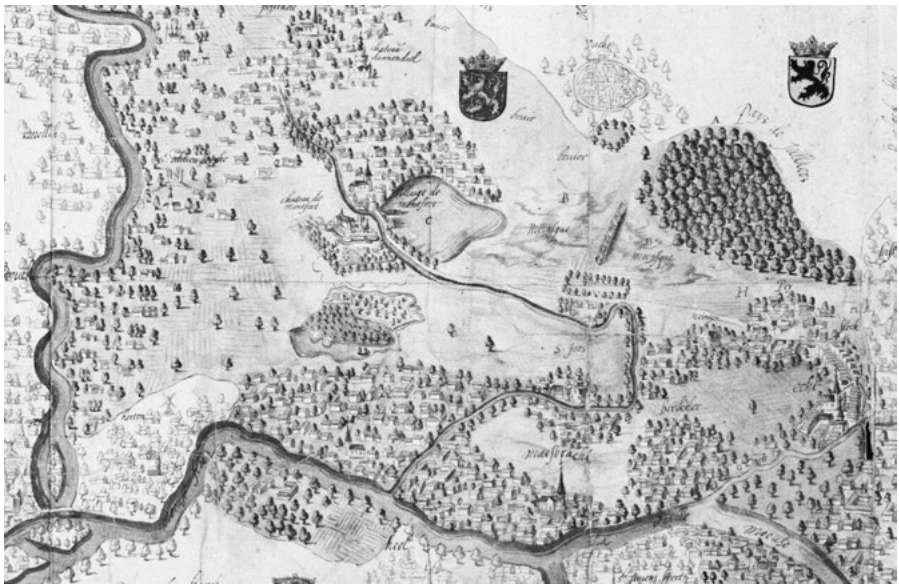

Figure 6. Map of the lordship of Montfort (detail), drawn by the engineer Philippe Taisne in 1625 (Brussels, ARA, Cartes et plans manuscrits, no. 73, *Carte topographique et figurative de la terre, la seigneurie et château de Montfort, avec les villages de sa dépendance, dressée, en vertu d'ordres de la Chambre des Comptes de Ruremonde, par l'ingénieur Philippe Taisne, en 1625*). Reproduced with permission of the Algemeen Rijksarchief / Archives générales du royaume.

ence. The French engineer de Vauban speaks of a *place forte*'s need for *dépendances*.[80] In order to study the relationship between these services and actual defensive needs, let us first examine the case of the fortress of Montfort, for which source material is relatively abundant. Besides a series of accounts, the oldest of which date back to 1294–1295, a map drawn by order of the Habsburg government has been preserved, which gives an exceptional depiction of the landscape there in the early seventeenth century (see figure 6).[81]

Henry of Guelders, bishop of Liège (1247–1274), founded the imposing fortress of Montfort on the right, or eastern, bank of the Meuse, close to Maaseik, in the 1260s. It quickly became a key fortress in the defence of the County of Guelders' southern frontier, because of its function as a seat of government. The lordship of Montfort is a classic example of what English medievalists have recently called "lordly" or "elite" landscapes: lands filled with symbolic elements of power.[82] Several brooks in the area were channelled towards this fortress to create huge fishponds, and the lordship also contained several forests, the most important of which was the Echterwald, located on the Guelders–Jülich frontier between the towns of Echt and Vucht. Landscape elements such as

80 Mourroux, "Stenay, ville militaire," 48.

81 Coenen, "Kasteel Montfort"; Meihuizen, *De rekening*.

82 Creighton, "Castle Studies," 5–17; Creighton, *Designs Upon the Land*; Liddiard, *Castles*, 97–121.

ponds or woodlands can be considered as status claims since access to game and freshwater fish was a social privilege. It was also a rather uneconomic way of land use. The owner of such lands showed that his socio-economic base was so secure that he could afford to use his lands for display rather than agriculture.[83]

It has become common practice to use this concept of elite landscapes to question or at least downplay the military role of medieval fortresses (or "castles"; see further in chap. 2), but the example of Montfort demonstrates that this is an oversimplification. There is no reason why a landscape feature such as a fishpond, which had obvious prestige value, could not have had a defensive role as well. In the case of Montfort, the fishponds were so extensive that a direct attack on the east side of the fortress became impossible. The chronicler Jean de Stavelot also wrote that in 1436 urban militias from the Prince-Bishopric of Liège first had to drain the ponds next to the fortress of Bossenove, near Rocroi, before they could assault it. This task took no fewer than three days.[84]

By the early seventeenth century, when the engineer Tassin drew a map of the lordship, the landscape had changed markedly in many respects, a situation also reflected in inspection reports. The Echterwald was at this point the only major woodland remaining in the area; the others had become simple heathlands. Several of the ponds became dry during the summer months, at which time the local population used them for pasture. Overexploitation was a major cause of the degradation of this elite landscape, but it cannot be seen in isolation from fifteenth- and sixteenth-century political events: the fortress no longer served as a ruler's residence, subjects of the Count of Jülich diverted one of the brooks supplying the ponds with water, and the lordship had suffered repeatedly during invasions. The impoverishment that resulted from these wars forced stewards to use lands in a more productive way. The deathblow to the last vestiges of the original lordly landscape came in 1650–1653, when soldiers stationed in the fortress dug a canal that drained the last remaining ponds.[85]

The slow growth of the lordship's permanent military presence might have had an essential role in bringing about these landscape changes. The oldest surviving accounts of the duchy, from 1294–1295, indicate that the "high bailiff" tasked with defending this fortress had at his disposal five knights doing guard duty because of feudal obligations, two gatekeepers, two sentinels, five watchmen, a crossbow maker and his son. A "garrison" of sixteen grown men and a child in times of war might seem wholly inadequate, but it is very much in line with the ways most fortresses were managed up to the late sixteenth century (see chap. 4). If an actual threat was imminent the garrison could easily be augmented to a hundred men and more. A garrison of about eighty soldiers was only established around 1578, and later expanded to about two hundred.[86]

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83 Coenen, "Een kasteel"; Coenen, "Kasteel Montfort"; Gentenaar and Hupperetz, "Personeel en werkzaamheden."

84 Coenen, "Kasteel Montfort," 76–77; Coulson, *Castles*, 72–76; Creighton, *Designs Upon the Land*, 80; de Stavelot, *Chronique*, 365–66.

85 Coenen, "Kasteel Montfort," 86–91; Coenen, "Het keerpunt"; Roebroeck, *Het land van Montfort*.

86 Coenen, "Kasteel Montfort," 86; Coenen, "Het keerpunt," 95; Meihuizen, *De rekening*, 8, 15 (text accounts).

These soldiers actively contributed to the overexploitation of natural resources by fishing in the moats, digging peat, and probably hunting as well. This behaviour was quite similar to that of their medieval predecessors, the main issue being that they were far more numerous.[87] Archaeozoological research of animal remains in Franchimont, a fortress located in the Prince-Bishopric of Liège with a similar strategic role, suggests that game, especially red deer and wild boar, constituted a significant part of its occupants' diet in the late fifteenth and early sixteenth century. According to the bishop's regulations from 1503 the household of the castellan residing here should include three horsemen (the castellan himself, his page, and a groom), four infantrymen, a gatekeeper, two sentinels, and two servants (male or female).[88]

The appearance of large permanent garrisons in most parts of the Meuse Region from the late sixteenth century onwards therefore contributed to changes in frontier landscapes, as military governors, invariably members of prominent noble families, incorporated these same elements of lordship in the landscapes that they had to defend. A court record from 1660 Namur indicates for instance that the Prince of Chimay, governor of the city, had his own hunting park (*garenne*) in the forest of Hastimoulin. A local chronicle from 's-Hertogenbosch likewise mentioned in the year 1697 that the governor's hunters killed a deer and a wolf.[89] This reveals that the governor employed gamekeepers to manage his hunting grounds, and that wolf and deer had become so rare in the area that their killing became noteworthy. Soldiers' fondness of hunting could in effect cause considerable damage and friction, with citizens as well as governors, because they rarely respected hunting regulations or private property (see chap. 3).[90]

Complaints about soldiers taking firewood from woodlands near their garrison should be read in a similar light. Providing garrison members with fuel, often coal or peat rather than wood, was the responsibility of the inhabitants in whose houses they lodged, the urban council, or the state, but these mechanisms often proved insufficient. Furthermore, the upkeep or expansion of fortifications and military material, notably gun emplacements, required substantial amounts of wood. Military garrisons would make sure they had access to nearby woodlands.[91] In one case this even meant appropriating their actual management. During the Central and Late Middle Ages the Ravensbosch near Valkenburg was the main forest within this prestigious lordship. From the sixteenth century onwards it also became a major supplier of wood for the garrison of Maastricht. Records kept by the chief engineer demonstrate that he bought trees (oak, ash, field elm) to plant in this forest in 1750, in the aftermath of the reoccupation of Maastricht by Dutch forces, and had a major role in the establishment of new regulations for the forest's management in 1765. He also had a say in the appointment of new

87 Arnold, *German Knighthood*, 85; Wadge, *Archery*, 114–15.

88 Den Dooven, "Les émoluments," 98–99; Gautier, Hoffsummer and Vanguestaine, "Faune," 75–88.

89 Douxchamps-Lefèvre, *Inventaire*, 3:268; van Bavel et al., *De kroniek*, 414–15.

90 The Hague, NA, Raad van State, inv. no. 2079, November 1, November 20, 1716; March 17, May 1, 1717; Verbois, *Rekem*, 296; Verschure, *Overleven*, 199.

91 Illaire et al., eds., *Les cahiers de doléances*, 129, 158, 167, 209, 474, 524.

forest wardens. It is indeed significant that in the early nineteenth century, when Dutch soldiers no longer had access to nearby woodlands, the garrison planted coppice wood in the outworks to secure their wood supply.[92]

Besides wood and game, garrisons also needed access to pasture for their horses.[93] Because of the sheer volume of forage consumed, cavalry forces typically stayed in regions with ample access to grasslands. The French government stationed a disproportionate part of its cavalry forces in the Meuse basin from the seventeenth century onwards because the river valley provided extensive pastures for their horses. In 1789 ten of the sixty-one French cavalry regiments had garrisons in the Meuse Region. Frontier cities and towns for their part were quite content to receive them because they could sell their hay to the military and use the horses' manure to fertilize their fields. The town of Rocroi went so far as to build new barracks and stables at its own initiative in 1721.[94]

Still, the intensive use of the Meuse and Sambre valleys by French cavalry units might have had other unintended results. Military consumption of hay and pasture removed a powerful incentive for local peasants to drain these areas and turn them into agricultural lands, thereby slowing down population growth in these areas. A 1693 plan to drain the meadows of the Sambre valley in order to use these fertile lands as agricultural fields was never executed because it would have prevented mounted regiments from garrisoning or even assembling in this area.[95] In sum, military management of frontier landscapes produced significant ecological results because it contrasted with agricultural or economic needs.

Military Training

After examining how armed forces perceived and managed frontiers in a general way, let us turn to one specific aspect of frontier management: military training. This particular feature of army–ecosystem interactions at landscape level deserves to be examined separately because it plays a key role in claims that today's military forces have become protectors of nature. It also draws attention to a neglected feature of military history, for few authors have devoted serious attention to how medieval and early modern armies practised military manoeuvres in peacetime; that is, beyond commenting on the adoption of "drill."[96] Military training is defined here as any activity that aims to prepare someone, or a group of people, for warfare. Since this study is specifically

92 Maastricht, RHCL, 07.E01, inv. no. 1: Guarnisoensboek, B, September 29, 1749, January 12, 1750; January 16, March 18, 1765; January 20, 1768, August 1, 1768; February 17, May 11, 1769; January 22, November 19, 1770; inv. no. 9, 1824 no. 76; Anon, "Houthem-Sint-Gerlach," 11–14.

93 Quicke, "Une enquête," 397.

94 Barbe, "Rocroy," 103, 119–20, 139; de Roussel, *Etat militaire de France, pour l'année 1789*; Le Moigne, "Le rôle économique," 218–19; Petitot-Bellavène, "Verdun," 91.

95 Ciriacono, "Dessèchements et politique agricole," 8 (http://books.openedition.org/editionsmsh/1334); Le Moigne, "Le rôle économique," 204, 218–19.

96 Houlding, *Fit for Service*; Kleinschmidt, *Tyrocinium Militare*; Rogers, *Soldiers' Lives*, 68–69; Settia, "Military Games."

concerned with frontier landscapes, the main emphasis will be on weapon handling and unit manoeuvres.

Frontiers are an obvious place for military training, because relatively few people lived there, armed forces were already present in these areas, and the chance that actual fighting would take place was relatively high. Military training can also be initiated to intimidate an antagonist, or to show off an alliance, in a way not dissimilar to joint U.S.–South Korean military exercises in recent years. It reinforces the perception of frontiers as a "frontline" by sustaining and intensifying alleged distinctions between the "self" and the "other," differences which could later justify the breaking of taboos during actual armed conflicts (notably killing other human beings).

Because large sections of a population could be called upon to serve in an armed capacity, military training became incorporated in other activities. In the Middle Ages in particular preparation for war often assumed the form of "games" or "sports."[97] The Rule of the Order of the Templars (1128–1129), which served as a model for other military orders as well, specfied that a member of order could engage in target practice, but was not allowed to wager any objects of value. He could also participate in *buhurts*, informal mounted combats in which the participants were often not in armour, but only if the commander was present. The Templars were a monastic order of fighting men. Military training was thus an important part of their lives, but the leisurely elements normally attached to it were not acceptable and forcefully removed or restricted. The rules regarding hunting confirm this impression. There is no doubt that hunting and warfare are directly linked to each other, and that hunting skills can be quite useful in warfare (the killing of other living beings, arms handling, riding, tracking, acting as a group, and so forth), but there was a world of difference between falconry and killing dangerous animals. Members of the Templar Order were therefore only allowed to hunt lions or accompany hunting expeditions when a Christian might be endangered. Hunting for pleasure, especially falconry, was strictly forbidden. Brothers of the Teutonic Order could likewise hunt large carnivores such as the wolf, bear, lynx, and lion, but were forbidden to use dogs. They could also shoot birds as target practice.[98]

The development of formal military training during the early modern period might have put further pressure on the close association of hunting with preparation for war. The prince de Ligne, a member of the oldest and most prominent noble families in Hainaut, and a general in Habsburg service, criticized existing practices in 1780 when he wrote that "you do not tell a recruit: I will make you a hunter, you have to take him from the woods." In the late eighteenth century "hunter" (*Jäger*, *jager*, *chasseur*) had become a general name for a particular kind of unit, "light troops" that typically wore green uniforms and might be armed with hunting rifles, but were apparently not necessarily composed of men with extensive hunting experience. A handful of units did establish

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97 Contamine, *La guerre*, 362–63; Kleinschmidt, *Tyrocinium Militare*, 27–29; Mehl, *Les jeux*, 58–59, 63–64, 194, 256; Settia, "Military Games."

98 Curzon, *La règle du Temple*, 84, 183–84 (rule nos. 95, 315, and 317), Perlbach, ed., *Die Statuten des Deutschen Ordens*, 47 (rule no. 23). See also Cummins, *The Hound and the Hawk*; Harrison, *Dark Trophies*; Manning, *Hunters and Poachers*, chap. 2.

a strong connection with forestry departments, but for these specialist units replacing wartime losses was a major problem (see chap. 4).[99]

The connection between hunting and woodlands, mountains, or wilderness is hardly a coincidence. It demonstrates that the ambiguous perception of frontiers as both wilderness and garden barriers is omnipresent in military training practices as well. Preparation for war, especially arms handling, is a very disruptive activity. The choice for particular practice areas close to or within frontiers is therefore closely related to the ways armies cooperated with society at large. They could opt for sparsely populated lands (wilderness), or close off their exercise fields from local inhabitants (gardens).

Studying military training in a historical context can be problematic, because arms handling is a skill that large parts of the general population were expected to master. The available sources are therefore biased towards more large-scale and notable military exercises, many of which included significant performance elements. The main issue from an ecological perspective is how important such events actually were in the long-term evolution of frontier landscapes. Their effects might be quite similar to that of actual battles, except that killing one's adversary was not the primary goal.

The oldest medieval tournaments, in the late eleventh and twelfth century, were indeed very hard to distinguish from real combat: they included fighters on horseback and on foot and there were very few rules. The well-known *Chronicon Hanoniense* of Gislebert of Mons (ca. 1150–1225) makes it clear that many of these early tournaments were held in the Meuse Region, and more specifically on the frontiers of its numerous principalities (such as Trazignies or Maastricht). David Crouch has rightly argued that the northern part of France, and the Southern Netherlands, including most of the Meuse Region, played a key role in the tournament's early history.[100] Even in the thirteenth century, when tournaments became more "urban" in character, they were still held in frontier areas (such as Andenne or Geertruidenberg).[101]

Tournaments were organized on or near frontiers because of their political signficance, but also took the presence of major roads, and the ecology of frontier landscapes into account. A horse's hoof exerts a force more than six times greater than a human heel on a level surface.[102] One can imagine the effects of a few hours of martial play with hundreds of horse hooves moving about on carefully tended agricultural fields. It is for good reason that many tournaments were held after the harvest was brought in, or even better, on land of relatively low value. The tournament of Chauvency (1280), arguably one of the most famous tournaments of the entire Middle Ages, was held in the river valley of the Chiers, between the town of Montmédy and the fortress of Chauvency, according to the verses of Jacques Bretel (1285). Such open grasslands were the most convenient

99 de Ligne, *Fantaisies militaires*, 110.

100 Crouch, *Tournament*, 27–29, 49–50, 124–25; Neumeyer, *Vom Kriegshandwerk zum Ritterlichen Theater*, 36–57.

101 de Behault de Dornon "Un tournoi à Mons," 386–91; *La chronique de Gislebert de Mons*, ed. Vanderkindere, 95, 101–2; Janse, "Toernooicultuur," 153; Poncelet, "La guerre," 277.

102 Liddle and Chitty, "The Nutrient-Budget of Horse Tracks."

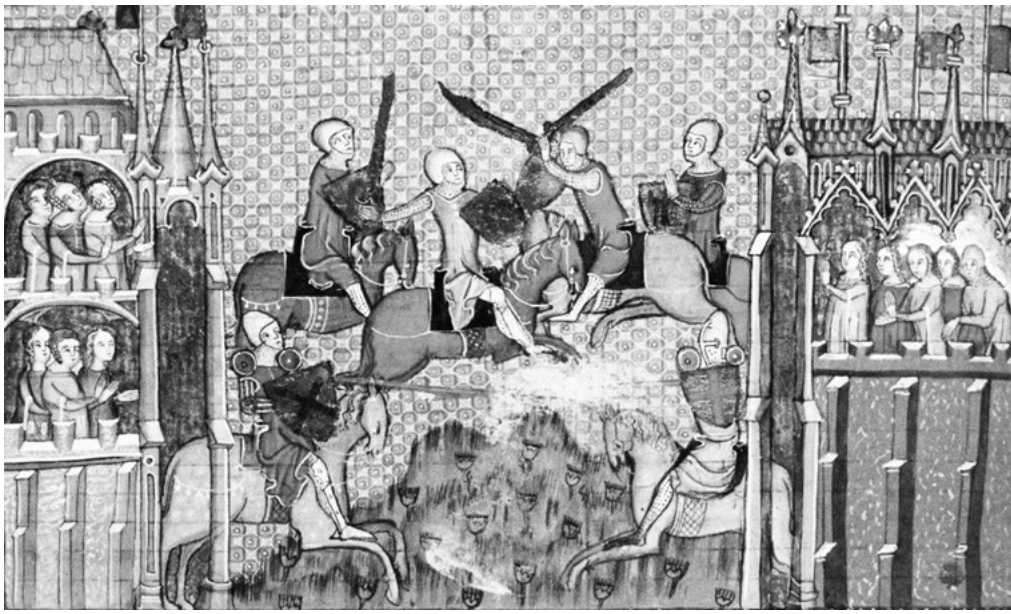

Figure 7. Medieval tournament held in the open fields between two fortresses, Hainaut, early fourteenth century (Paris, BnF, MS français 122: *Lancelot Graal*, Piérart dou Tielt (atelier), 1344–45, fol. 80v).

place to organize a tournament; they were not enclosed and served simply as pasture and for hay production (see figure 7).[103]

By the fourteenth century the tournament proper, the melee or the charging of two groups of knights at each other, had all but been surpassed by the individual joust. Most tournaments were now held within towns, and group combat subsisted as only one part in a series of competitions. This should not be taken to mean, as has often been claimed, that tournaments lost their military relevance altogether. When Charles V (Emperor 1519–1556, Lord of the Netherlands 1506–1555) came to the Low Countries in 1549 to present his son, Philip II (1555–1598), as his successor, there were both huge public activities, such as a mock battle outside Brussels, and still large-scale but more private forms of spectacle, such as the storming of a "castle of love" in the hunting park of Mariemont (Hainaut), where eight knights disguised as "savages" held four noble ladies prisoner.

The latter performance, which involved at least several hundred soldiers, is particularly revealing because the young prince is portrayed as an ideal successor surrounded by noblemen from all over the Habsburg Empire in the context of a controlled space, a hunting park and gardens, which just happen to serve as symbols for the unity of one's own territory. It should also be stressed that while all this might seem more like the-

103 Bretel, *Le Tournoi de Chauvency*, 106–8; Neumeyer, *Vom Kriegshandwerk zum Ritterlichen Theater*, 289–333.

atre than military training, the front of this castle, described as a *bastillon*[104] in a fiscal account recording the tournament's expenses, was composed of bricks, and the actual assault involved a range of manoeuvres, including livestock raiding, an attack on a convoy, and live firing at the *bastillon*. The besieging army included cavalry, infantry, artillery, pioneers, and at least one engineer. Three hundred and seventy-six infantrymen were drawn from the frontier with France to participate in this event. There were no human fatalities, but at least one horse died as result of a lance thrust, a nobleman suffered burns because his beard and clothing caught fire, and several others fell from the castle's walls during the attack. It can be very difficult to distinguish theatrical elements from practical military needs, and the question remains to what extent contemporaries actually made such distinctions.[105]

The tournament of 1549 establishes a useful link between medieval tournaments on the one hand and early modern military training exercices on the other. Despite the supposedly "revolutionary" character represented by the adoption of drill in the late sixteenth and early seventeenth century, particularly in the Dutch army, there is relatively little evidence for how armies practised unit manoeuvres. A new kind of military handbook made its appearance in this period, one that stressed the importance of drill and provided numerous illustrations to accompany the text, but it is quite unclear to what extent such manuals represent actual practice. David Parrott and Erik Swart have stressed the informal character of contemporary military training, based more on experience than formal drill.[106] A notarial act from 1652 Rotterdam, concerning a soldier who refused to follow orders, mentions that the unit to which this man belonged exercised outside the walls, the same spaces Habsburg and French forces utilized for their military reviews.[107] It is useful to note that open fields or heathlands regularly served as background for target practice as well, even though permanent shooting ranges existed from at least the fourteenth century. The citizens of 's-Hertogenbosch, for instance, dragged a newly cast gun to the heath and marshes outside the city in 1545 in order to test it, according to the city's accounts.[108]

The connection between military exercises and city walls, the city's "frontiers," was mirrored at a much larger scale by the establishment of major training camps on state frontiers from the late seventeenth century onwards. The establishment of these camps should be seen in the context of a significant growth in the size of armies in the period from 1660 to 1760, which made it necessary to practise manoeuvring with bigger forces. Surviving reports and plans demonstrate the intention of training soldiers

104 A small *bastille*, meaning a *blokhuis* or bulwark (see chap. 2).

105 Bragard, *Dictionnaire*, 52–53, 249; Buchon, ed., *Oeuvres complètes de Pierre de Bourdeille*, 1:302–4; Frieder, *Chivalry and the Perfect Prince*, 135–58, 183; Marquet and Glotz, eds., *Une relation*, 57–62; Wellens, "Un compte."

106 Parrott, *Richelieu's Army*, 38–48; Swart, "De mythe van Maurits en de moderniteit."

107 Rotterdam, SAR, ONA, inv. no. 452, no. 44 October 1, 1652; Boonen, "Maaseiker soldeniers en huurlingen," 11; Callot, *Les Grandes Miseres et les Mal-heurs de la guerre*, depiction of a military review; von Adlersfels-Ballestrem, ed., *Memoiren*, 11, 21.

108 van Zuijlen, *Inventaris*, 2:626.

in camping and foraging as well as military manoeuvres in the strict sense of the word (including mock battles, sieges, and bridge building). Camps were typically pitched in grasslands or heathlands, but with access to running water.[109] The French army thus established training grounds next to the Sambre, near the village of Aymeries, in 1727, 1732, 1753, 1754, and 1755.[110] As surviving maps indicate, these areas were sparsely populated, and therefore easy to rent or appropriate, and provided the necessary wide-open spaces. The soldiers even had to flatten the prospective sites so that no obstacle impeded manoeuvres. Yet all this made these encampments more vulnerable to sustained rain showers and the resultant flooding. The Dutch training camp in Oosterhout, organized in the heathlands near Breda in 1732, had to relocate twice because of incessant rain and the flooding of the campsite, and was eventually broken up prematurely.[111]

Because campsites were chosen for their strategic locations, it comes as no surprise that some of them were held near or on actual battlefields. When Walloon regiments of the Imperial army performed the manoeuvres prescribed by their new drillbook, in 1767, 1768 and 1770, they did so near Jemappes, the same common lands, used as pasture, where they were defeated by a French republican army in 1792. While the ecological effects of one encampment or battle would be ephemeral, the focus on specific areas could lead to long-term effects.[112] This was especially so if camping involved major landscape changes. Dutch officers of the military academy in Breda for example referred to some artificial hills near the city as the "English Mountains" at the end of the nineteenth century. They thought British troops had constructed them during the 1793–1795 campaigns against France, while they were actually remains of Dutch practice camps from 1769 and 1776. These hills served as huge butts to prevent any cannon balls from flying off the range. The published testimony of a corporal of the English footguards confirms that the British army was not responsible for the hills' construction, but that its members were well aware of their military origin. It is worth noting that both Dutch and British soldiers contributed to the lowering of the groundwater level by digging wells in these heathlands, where water was relatively scarce.[113]

While such notable events involving relatively large numbers of combatants were closely connected to frontiers, due to their very transient character they provide little evidence of long-term ecological consequences. Less prominent military activities, however, also produced lasting effects, because they occurred repeatedly on the same piece of land. As far as the Meuse Region is concerned, the appearance of permanent training grounds can be traced back to the creation of brotherhoods or guilds of crossbowmen from the thirteenth century onwards. These were later supplemented by archers,

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109 *Ordonnance Corps du Génie*, 43–44; Chagniot, "Les camps"; Pierrot, "L'arrondissement de Montmédy sous la Révolution," 18–20; van Nimwegen, *De Republiek*, 111–14.

110 Paris, BnF, Département Arsenal, MS 6452 (456); MS 6452 (457); MS6452 (458B,1); MS 6452 (458B,3); MS 6453 (461); MS 6453 (462); Département cartes et plans, GE D–16345.

111 *Nauwkeurig dag-verhaal van 't campement bij Oosterhout*, 3, 21, 23; van Seters, "Het Campement bij Oosterhout anno 1732," 140. See also Duyck, *Journaal*, 3:485.

112 Gosseries, "Souvenirs militaires de Mons," 239–43.

113 Brown, *An Impartial journal*, 187–89; de Bas, "De Kalix Berna of Kalbergen."

(hand)gunners, and swordsmen's guilds. The oldest surviving such charter dates back to 1266 Namur and was granted by Guy of Dampierre, Count of Flanders and Margrave of Namur (1253/1263–1305/1298). Because these men trained regularly, at least once every two weeks, they were considered a military elite; they had a major role in the maintenance of law and order, were always the first choice for military expeditions, and served as permanent guards on city walls during conflicts.[114]

From an ecological viewpoint, it is important to note that only a relatively small part of the adult male population engaged in these exercises, in contrast to late medieval England, where every adult male was supposed to own a bow and arrows and practise regularly. The terrains allocated to these associations tend therefore to be described as enclosed spaces (*courtils*) or gardens[115], while in England target practice usually took place on common land and frequently led to the massive destruction of gardens (enclosures).[116] Such shooting ranges, which could contain fruit-bearing trees and vines, were often located just inside or outside the city walls ("frontiers"), mostly in dry moats, especially if these ditches had lost their original function due to the expansion of the fortifications. In the fifteenth century one of the companies of crossbowmen in Dinant, according to the town's cartulary, practised shooting at the foot of the walls, the other in part of the dry moat.[117] Shooting guilds lost most of their military importance over time, and were disbanded in most garrison towns as early as the late sixteenth century, as central governments considered them unwanted competition for regular military units.[118]

The relative decline of these militias corresponded with a more general shift towards paid troops, "soldiers." As mentioned earlier, it is unclear where these men trained, and whether they occupied a specific terrain for such purposes, before the eighteenth century. The garrison orders of Namur are one of the few sources to provide good, detailed information. They indicate that the infantry, artillery, and cavalry more or less had their own drill grounds in 1759–1761. The cavalry exercised in the open fields outside the Porte de Jambes (near the like-named village, to the southeast of the city), the artillery next to the Meuse, outside the Porte Saint-Nicolas, and the infantry mostly outside the Porte Bulet (see figure 8). This does not mean that access to suitable grounds was easy. The garrison had to pass review in April 1761 outside the Porte Saint-Nicolas instead of Porte de Jambes, for example, because of obstruction by the city council. The governor complained to that same body in 1771 and 1772 that owners of the training fields near Jambes not only sowed them, but that one man even turned his lands into a garden (that

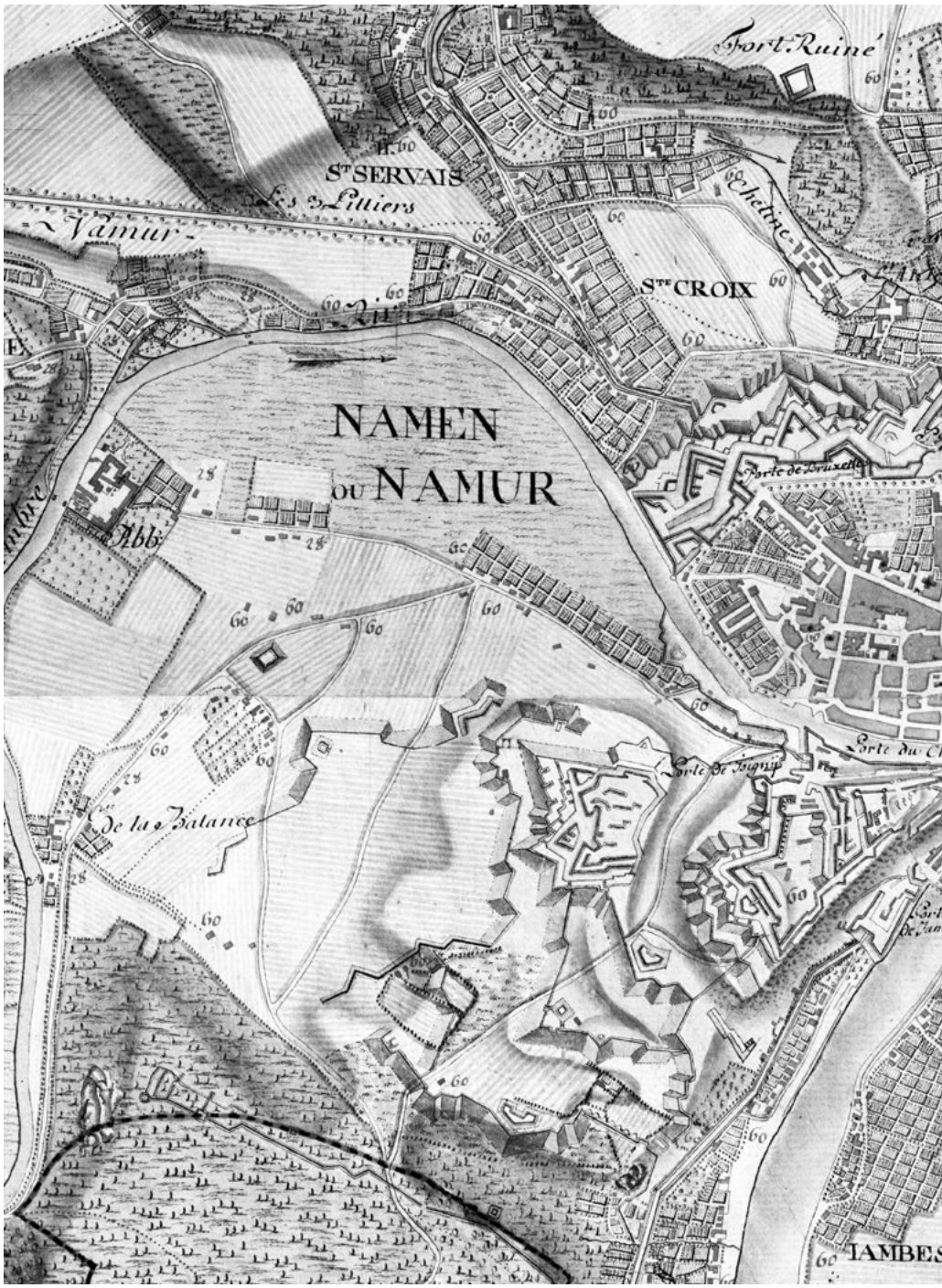
114 Borgnet, *Histoire*, 4–6, 14, 26–27, 43–44; Devillers, "Notice historique sur la milice communale"; Thewissen, *De gezworen schutterijen*.

115 Tongeren, SAT, Resoluties, inv. no. 1, fol. 21r.; Borgnet, *Histoire*, 9, 16–17, 26–27, 43, 45, 48; Bormans, "Extraits des cris du péron," 209; de Groot, *De stadsrekeningen*, 1399a f. 23; Devillers, "Notice historique sur la milice communale," 178–79; Gaier-Lhoest, *L'évolution topographique*, 42, 44; Mora-Dieu, "Les corporations," 208; Rizzo, "La prévôté de Marville," 13; Thewissen, *De gezworen schutterijen*, 183–91; van der Eerden-Vonk, *Raadsverdragen*, 379, 397.

116 Gunn, "Archery Practice," 53–57, 63.

117 Bormans, Lahaye, and Brouwers, ed., *Cartulaire de Dinant*, 2:52–54, 2:58–60, 3:206–7.

118 Denys, *Police et sécurité*, 118–30; Thewissen, *De gezworen schutterijen*, 251–56.



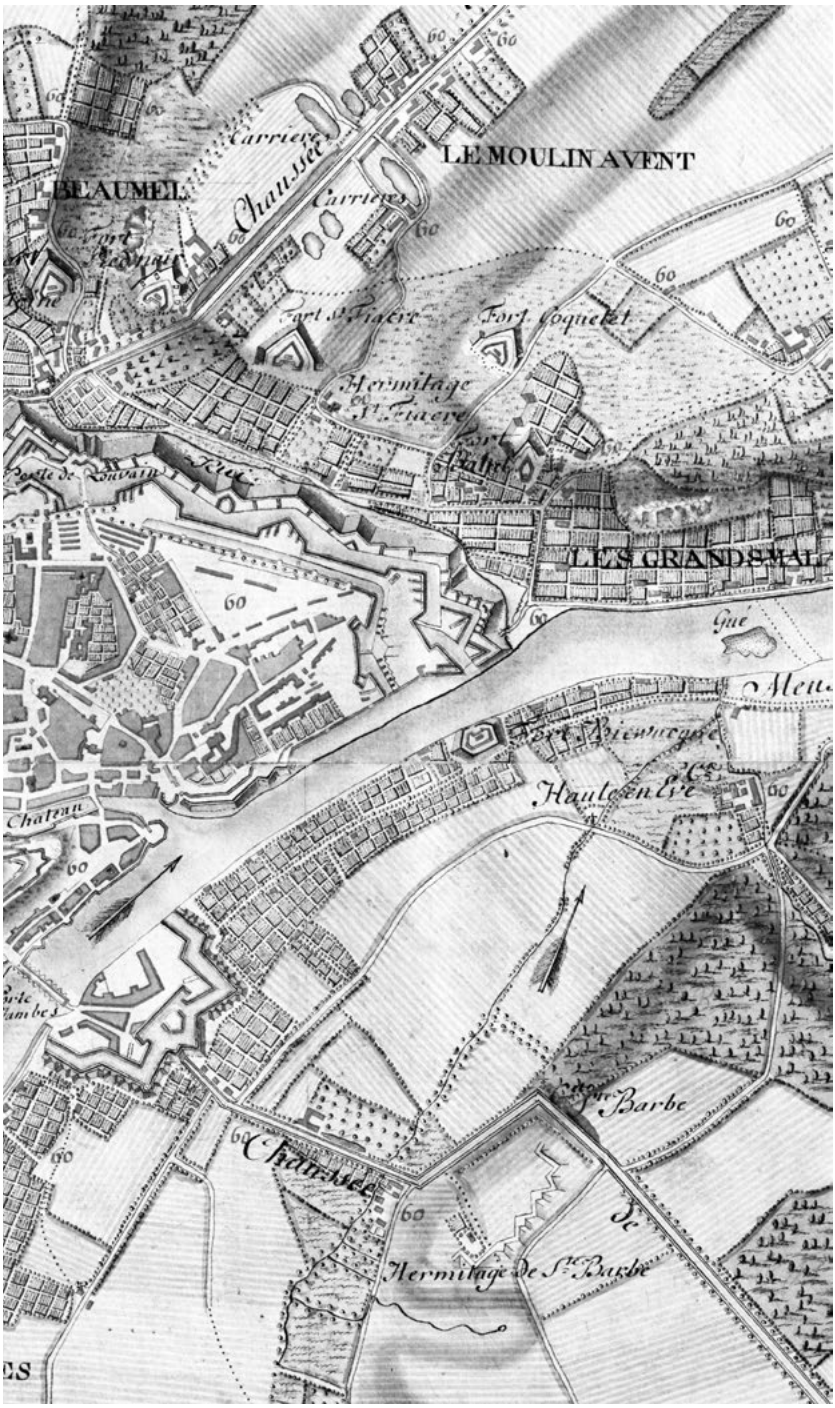


Figure 8. Depiction of Namur and its immediate surroundings, map of the Count de Ferraris, 1777 (Brussels, KBR, Cartes et plans, MS IV 5.567: *Carte de Ferraris*, fol. 116). Reproduced with permission of the Bibliothèque Royale de Belgique/Koninklijke Bibliotheek van België.

is, he enclosed it). Apparently, the sowing had been allowed earlier only as a special favour.[119]

The governor's opposition to the enclosure of fields was reminiscent of an earlier conflict, in 1749, shortly after the Dutch garrison reoccupied the city. The governor wanted to establish training grounds large enough to accommodate the entire garrison, and demanded access to the Plaine de Salsinnes, to the west of the city, near the castle, which in his view were common lands and therefore suitable for military training. He also argued that the garrison already used them for military exercises before Namur had been lost to the French in 1745. Internal correspondence reveals that Dutch officers preferred to use this plain to prevent citizens from constructing earthen embankments with hedges or dig ditches, which facilitated an attack on the castle. The governor got his way and a training field was established, but it remained the property of individual citizens. The aforementioned references to the garrison orders of 1761 prove that the Dutch army eventually did lose access to these grounds and that such conflicts over land use were not solved for the long-term.[120]

The garrison of Maastricht meanwhile experienced similar problems. In 1790 it reached an agreement with a citizen named J. M. Theelen, who leased the right to cut the grass on the fortifications, to use fields next to the walls for training purposes. The soldiers could train there before the harvest, from February until the first half of May, for five years. Yet the contract also specified that cavalry units could not enter. The leaseholder was evidently well aware that this resulted in far more extensive compaction of the soil. In order to provide their cavalry with suitable space for manoeuvres, the garrison appropriated about six hectares of land in Amby, a village to the east of Maastricht, that very same year. This land, known as the Geuselderenbroek, consisted of a significant part of the village's common land as well as some meadows owned by major landowners. Its extensiveness also made it suitable for advanced manoeuvres with all infantry regiments together. Detailed fiscal accounts have been preserved, which demonstrate that, since charging on marshy ground is very difficult for cavalry units, soldiers turned them into suitable training fields by flattening the soil and digging drainage canals. The only concessions made to the villagers consisted of allowing them to pollard the trees on the edges of the field, and pass through with their wagons or carts, but only outside the drill season, and all tracks had to be levelled afterwards.[121]

During the eighteenth and especially nineteenth century military forces increasingly began to feel the need for larger areas where they could practise on a permanent basis without causing conflicts or, conversely, without being disturbed. These camps

119 The Hague, NA, Raad van State, inv. no. 2079, Orders March 23, 1714, August 5, 1715, September 10, September 11, 1716; inv. no. 2081, Orders April 24, May 16, 1741; inv. no. 2087, Orders May 9, May 22, May 23, May 25, May 26, 1759; May 20, May 23, 1760, April 24, May 26, May 27, May 28, 1761; inv. no. 2088, Orders June 16, September 14, 1771, September 25, September 28, September 29, December 13, 1772; May 25, May 26, September 20, 1773; May 23, May 24, May 25, June 22, September 30, 1774.

120 The Hague, NA, Raad van State, inv. no. 2598: Plaine de Salsinnes.

121 The Hague, NA, Raad van State, 2074: Garnizoensorders Maastricht, Geuselderenbroek.

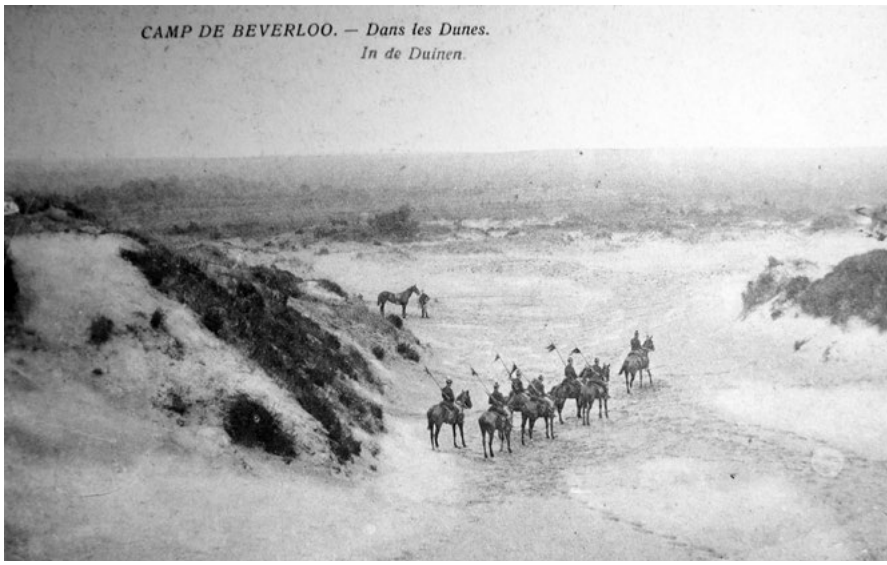


Figure 9. Cavalry patrol in the dunes and drift sands near the Camp of Beverlo, early twentieth century (postcard).

also served changing military needs, notably an increased emphasis on target practice and more diverse kinds of terrain on which to manoeuvre. The Napoleonic garrison of Maastricht, for example, reoccupied the Geuselderenbroek. In marked contrast to their predecessors, they also used it for target practice in 1808, which in turn prompted an immediate complaint by the city's mayor to the prefect. The new Netherlands government subsequently established several large training grounds on heathlands in the 1820s.[122] The Belgian army followed suit and founded the camp of Beverlo in 1835. This has proven to be one of the most long-lasting training grounds in the Meuse Region. The camp's location, in the middle of desert-like heaths and drift sands of the Campine/Kempen, gained considerable strategic importance in the aftermath of the Ten Days' Campaign (1831), as it controls a major road leading from Eindhoven to Hasselt. It was originally made near the garrison of Diest, but transferred to this desolate wilderness because the lands were inexpensive (see figure 9).[123]

Parts of the camp, now military domains, have received protection in the 1990s because of their value for endangered flora and fauna, mostly species that depend on

122 Maastricht, RHCL, Frans Archief, inv. no. 710: letter of August 1, 1808; Biemans, *August von Bonstetten*, 87, 129, 203; Teunisse, *Onderdaan in Oranje's oorlog*, 71, 72–74, 94, 102–3, 119, 121–23, 125, 127; van der Heijden and Sanders, eds., *De levensloop*, 78.

123 "Notice sur l'armée néerlandaise," 94–95; Delameillieure, "Het kamp van Beverlo," 51–60; Roymans, Beex, and Roymans, "Some Napoleonic-Style Army Camps"; Weuts, *Honderdvijftig jaar kamp van Beverlo*, 10–11; Wanty, *Le Milieu militaire belge*, 61–64.

heathlands and drift sands for survival. The ecological value of these military domains is therefore similar to that of other training areas in Western Europe: they preserve landscapes that have become very rare elsewhere due to changes in agricultural practices. The Belgian army's disruptive activities—the trampling of the soil, earlier by horses and now by mechanized vehicles, and the burning of vegetation as result of live firing—more or less ensure that this desert-like landscape does not turn into woodlands. These domains' garden-like character (they are not freely accessible and often enclosed) makes them a safe haven for endangered species as well.[124] While the military deserves credit for this protection, they also made a significant contribution to the disappearance of these same heathlands and drift sands. The Belgian army after all used the labour force of a penal company, the only unit to be stationed permanently in the camp, to turn one hundred and forty hectares of heathland into gardens (a quarter of the total), grasslands (an eighth), woodlands (one half), and plant nurseries (an eighth) in 1847–1849.[125]

These changes were initially very practical responses to the challenges posed by this landscape: the lack of cover made soldiers' tents and huts very vulnerable to the wind, there was very little or no running water, and food for man and horse alike had to be imported from elsewhere. Soldiers thus planted pine trees to strengthen the soil and shield their encampment from the wind, dug wells, and used their own horses' manure for the fertilization of these lands. By the 1850s, a new canal and a railway made the camp more accessible. Such landscape changes considerably raised the status of the army, for it made itself useful in peacetime by turning the wilderness of the Campine/Kempen into valuable land. But none of the more ambitious programs, such as a horse-breeding project, were ever put into practice. Perhaps its most enduring influence is the town of Leopoldsburg (Bourg-Léopold), created in 1835 because so-called camp followers were not allowed to live in the actual camp; a stringent reminder that the military–civilian divide had now become the norm.[126]

Conclusion

Military domains, rather than being a symbol of progressive behaviour, are actually the isolated remains of what were once far more encompassing and diverse strategies of frontier management. Armies in the Meuse Region contributed to landscape variety on frontiers from the thirteenth to the nineteenth century because their actions were well integrated into the fabric of societies in the past, even though they often opposed economic needs. Military concerns helped preserve some of the last remaining stretches of wilderness from agricultural expansion, as they were efficient barriers against an enemy attack.

Developments within armies themselves—a relative increase in scale, and standing forces, combined with modifications in agriculture, notably enclosure movements—

124 Sterckx and De Blust, *Heide in de vuurlinie*, 16–18, 90–99.

125 Brion, "L'armée"; Delameillieure, "Het kamp van Beverlo," 61–72.

126 Brion, "L'armée"; Delameillieure, "Het kamp van Beverlo," 64, 70; Eenens, *Ontginning*; Wanty, *Le Milieu militaire belge*, 91–94.

stimulated the appropriation or acquisition of permanent training grounds from the eighteenth century onwards. These areas laid the basis for current military domains. They are considered ecologically valuable because the military's disruptive activities preserve landscapes that have disappeared elsewhere, such as heathlands and drift sands, while also providing a refuge for endangered species. Given that such military domains are to a greater or lesser extent closed off from the general public, one might say that they have preserved a wilderness by turning it into a huge garden. But comparing these last refuges with the large stretches of wilderness preserved by historical armed forces gives a somewhat gloomy perspective of ecological conservation today.

Chapter 2

FORTIFICATIONS

Defences and Their Basic Maintenance

Apart from frontiers, another kind of militarized landscape plays a significant role in debates about the ecological effects of warfare and military forces. The Meuse Region abounds with abandoned fortifications, from prehistoric and Roman times to the Second World War. Every year thousands of bats seek out bunkers, forts, and ruins for hibernation, because of the constant low temperatures and high humidity. Many have also become sanctuaries for rare species of wall vegetation and lichens, or serve as city parks (such as Namur, Liège, Jülich). A handful of former fortifications have even been turned into nature reserves to protect the rare species that dwell there. The Bossche Fronten in Maastricht for instance provides a home for one of the northernmost populations of wall lizards (*Podarcis muralis*) in Europe, not to mention many rare flowers, herbs, and lepidoptera (butterflies and moths).[1]

The aim here, as with the previous chapter, is not to question the value of such structures for current ecological conservation, but to expose some of the underlying assumptions. Very few, if any, serious attempts have been made so far to assess to what extent the biodiversity of former fortifications is based on or relates to their management when armed forces still controlled them.[2] Old walls overgrown with various plants or a ruin covered with moss and/or lichens fit well into a romantic idea of nature reclaiming its rightful place, and support a general belief that ecological conservation and peace are intrinsically linked to each other. It also creates a dichotomy between those who want to preserve the structures' heritage and those who primarily seek to maintain their ecological value. The city of Namur for example suffered disputes on the issue whether the trees standing on the former castle should be removed because their roots could damage historical edifices.[3]

This chapter studies the ecological impacts of these varied types of fortifications when they still had military value and were maintained with this function in mind. It thus considers fortifications as militarized landscapes in order to establish a link between the historical management of defensive edifices, and their current ecological state. The main aim is to consider whether armed forces had a significant role in bring-

1 Brandes, "Burgruinen"; Brandes, "Flora und Vegetation"; Harbusch, Engel, and Pir, *Die Fledermäuse Luxemburgs*, 10, 26–34, 74, 90, 136; Maassen and Vennix, *De groene vestingmuren*; Pelzer and Kerz, *Der Jülicher Brückenkopf*; Thoen, "Bouillon"; Weeda, "Maastricht," 258–67.

2 See especially Boosten, Jansen, and Borkent, *Beplantingen*; Cremers, Kaaij, and Steenbergen, *Bolwerken*, 121–47; Jordan, "Grün in Festungen"; Neumann, *Festungsbaukunst*, 368–76.

3 Boosten, Jansen, and Borkent, *Beplantingen*, 108–11; Bragard et al., *Namur, la citadelle hollandaise*, 140–42.

ing about and preserving landscape elements that are now considered valuable for ecological conservation, and to what extent they preserved these structures in a manner currently recommended by environmental organizations. If this were the case, then this chapter lays the second keystone for the argument that armed forces did preserve ecosystems centuries before the rise of environmentalism.

Most historical analyses of fortifications only examine them from the perspective of military architecture, or their relationship to general society, and devote little attention to the ecological aspects of such structures. The field of castle studies is an exception, for it has seen an increasing number of studies since the year 2000 that aspire to go beyond the traditional image of "strongholds," and analyze castles as central elements within larger "noble" or "elite" landscapes. Such novel approaches are invaluable in understanding interactions between armed forces and ecosystems. The meaning of the term "castle" (*castrum*, *castellum*) in medieval sources is in fact quite ambiguous. Often they simply refer to noble "houses." Recent emphasis on a castle's basic function as a residence is especially important since it has led to a better understanding of landscape elements that figure as symbols for lordship (woodlands, ponds, gardens, and suchlike). Still, arguing that most castles had no military function, or at least that this function was subordinate at best, as Robert Liddiard has done, might be equally missing the point.[4]

The poem "Le Jugement dou roy de Behaigne," for example, was written in the 1330s by Guillaume de Machaut, secretary of Johann von Luxemburg, King of Bohemia and Count of Luxemburg (1310/1313–1346). It gives an exceptional description of the house ("castle") of Durbuy on the Luxemburg–Liège frontier, and describes it as being located on a rocky mount in the middle of a valley, surrounded by a river (the Ourthe). There were orchards filled with birds whose song echoed through the valley, a spring, a fountain, and broad and long meadows above the riverbanks with many kinds of herbs and grasses. The protagonists (a knight and a lady) had never seen a place so beautiful, so noble, and so easy to defend. Even the kings or France or Germany could not take it. The poet also specified that the house was located far enough from the surrounding hills so that no crossbow or siege weapon could reach it. The castle's aesthetic and military qualities were thus complementary rather than conflicting.[5]

It is worth noting that while this poem certainly gives an idealized image, it is still based on the site's actual geographical features. Any missile fired from the hills would have to cover at least three hundred metres to reach the fortress. This is indeed outside crossbow range. A trebuchet might still be able to target the fortress, but only by throwing smaller stones, which could only inflict limited damage.[6] Furthermore, Count Johann of Luxemburg did make efforts to make his house more secure, for in 1325 he asked papal permission to demolish a chapel that impeded its defence, and rebuild it on another location.[7]

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4 Coulson, *Castles*; Creighton, "Castle Studies"; Liddiard, *Castles*, 70–96, 151–52.

5 Machaut, *Oeuvres*, ed. Hoepffner, 1:109–111 (vv. 1379–1431).

6 Purton, *The Medieval Military Engineer*, 174–76.

7 Fayen, ed., *Lettres*, 1:592–93; Vannérus and Grob, eds., *Dénombrements*, 551, 559.

Given that distinctions between armies and general society were not drawn very rigidly before the eighteenth or nineteenth century, it is only natural that many fortifications had multiple functions and were well integrated into people's daily lives. Every inaccessible place, including caves, quarries, woodlands, and marshes, could of course become a refuge in times of insecurity. This does not automatically turn it into a "fortification." Churches for instance had an important refuge function, but one can only consider them as fortifications if they incorporated features such as arrow or gun slits, and battlements with or without murder holes (*machicoulis*).[8] A fortification will therefore be defined in this study as a material reinforcement or barrier constructed or adapted to strengthen a place against attack. It is therefore invariably man-made to some extent, for even rivers, hedges, or woodlands need to be modified to military needs in order to become defensible.

In this context the question against whom people were trying to defend oneself becomes of major importance. One of the reasons why many types of fortifications have been left largely unexamined until now is that scholars assume that a certain scale is a prerequisite before we employ the terms "warfare" or "armies." If one does not accept that huge armed forces with the latest siege equipment were the only threat, then the military function of less elaborate defensive structures is much harder to ignore. Such an approach also has the advantage of contradicting the simplistic, but widespread, idea that rural areas are essentially undefended, or "flat" (*plat pays*, *platteland*).[9]

The safety provided by fortifications often went beyond warfare and armies, as attested by an example from a late medieval fiscal account. In 1495 the high bailiff of 's-Hertogenbosch sent members of the city's shooting guilds to the village of Liessel, between Eindhoven and Venlo, to bring a notorious highwayman, who had been taken prisoner by the villagers at their *landweer*, to him.[10] *Landweren* or *Landwehren*, earthen embankments with hedges planted on top of them, which could be several kilometres long, had an important role in maintaining safety in the countryside, because they restricted the movements of both people and animals, and forced them to use guarded routes.

It is indeed significant that the term *Landwehr* or *landweer* originally referred to the duty of a population to defend the land if called upon. Given this origin, the word chiefly appears in sources from German-speaking lands, as well as the Northern Netherlands. It is possible that such defences were more elaborate in those areas, but one can find similar structures throughout the Meuse Region. They are just not called *Landwehren*.[11] When the chronicler Jean de Stavelot wrote that horsemen from Maastricht rode up to the hedges of Heure le Romain in the late fourteenth century to draw out the defenders,

8 Genicot, ed., *Les Tours*, 122–26, 131–42; Pagnotta, *Les églises fortifiées*, 116–28.

9 Gaier, "La fonction." See also Gold and Revill, "Landscapes of Defence."

10 Brussels, ARA, 1107 Rekeningen Hoogschout 's-Hertogenbosch, inv. no. 12996, 080.1.2.12 (transcript Henk Beijers Archiefcollectie); Kraus, *Die Aachener Stadtrechnungen*, 426. See also Contamine, "Scènes de chasse," 238.

11 Brokamp, "Landweren," 1:13–26, 1:30, 1:38–57, 2:104; Engels, "Die Instandsetzung"; Gaier, "La fonction," 767–68; Huyskens, "Stadtbefestigung," 183–88; Kneppe, ed., *Landwehren*; Ulrix and Paquay, *Zuidlimburgsche plaatsnamen*, 8, 20, 26–31, 41–44, 47, 56, 58–59, 66, 86–87, 91.

he meant that they approached the barriers that defined the spatial limits of the village. The settlement might have been fortified with ditches and earthen embankments in the same way as a city wall.[12] Hedges, with or without ditches, are one of the most ubiquitous, but also most neglected, object of study as fortifications. Similar defences can be found in many parts of Europe, in Sub-Saharan Africa, the Yucatan, and Southeast Asia. Caesar already mentioned their use by the Nervii, probably in the Scheldt basin, in the first century BCE. It is an agricultural technique that could easily be converted to warfare.[13]

Many hedges would have been composed of common hawthorn (*Crataegus monogyna*), which is still used in the Meuse Region today. Alternatives could include blackthorn, seabuckthorn, and non-thorn bearing trees or shrubs such as beech, oak, and hazel, depending on the hedge's primary function. Woodlands acting as barriers in frontier landscapes could also be called "hedges" for instance (such as the Haies d'Avesnes). A hawthorn hedge is the most difficult to get through, but its wood is an unsuitable source of either fuel or timber. The "laying" of a hedge, a general term to describe techniques to cut and intertwine branches in such a way that the hedge becomes an impassable wall, was likewise a common way to turn a hedge into a more formidable defence, but it made it a far less productive supplier of wood. Some hedges were not even composed of living plants: the use of wooden poles with willow branches woven between them was a common alternative.[14]

The late medieval accounts of cities like Geldern, Grave, and Venlo suggest that many structures were actually combinations of living hedges and fences, as they mention the use of wooden poles, planks, willow branches, and thorns.[15] Given that it takes several years before a newly planted hedge becomes a real obstacle, and that it is always possible that gaps appear because individual plants die, it was common practice to combine living with non-living materials. Once a hedge has matured, however, it is far easier to maintain than fences or palisades.[16] A small town like Bree for example, located in the Campine/Kempen, planted three thousand eight hundred thorn bushes and twelve

12 De Stavelot, *Chronique*, 114.

13 Caesar, *Gallic Wars*, Book 2, chapters 17–26; Charney, *Southeast Asian Warfare*, 92; Palka, "Ancient Maya Defensive Barricades," 428; Seignobos, "Pre-Colonial Plant Systems."

14 Brokamp, "Landweren," 1:46–48; Capelle, "Landwehrbau," 26–28; de Groot, *De stadsrekeningen*, 1385 fol. 6; 1386 fol. 7; 1387 fols. 5, 8; Duceppe-Lamarre, *Chasse et pâturage*, 240–41; Kraus, *Die Aachener Stadtrechnungen*, 155; Kuppers, "De stadsrekeningen," 105, 134, 220; Vera, *Grazing Ecology*, 159–62; Weerth, "Westfälische Landwehren," 160–61.

15 Grave, SLC, Archief Gemeente Grave, inv. no. 217, fols. 7r, 94r, 217r, 258r, 267r, 277v; inv. no. 218, fols. 173v, 175v; de Groot, *De stadsrekeningen*, 1384 fol. 5; 1385 fols. 7, 8, 39; 1386 fol. 7; 1387 fols. 24, 26, 28; 1388 fols. 9, 15, 26; 1394 fols. 9–10; 1396 fol. 16; 1397 fols. 8–9; 1399a fol. 8; 1400 fol. 6; 1402 fols. 9, 20; 1404 fol. 24; 1405 fol. 14; 1406 fol. 8; 1407 fol. 15; 1408 fol. 10; 1409 fols. 10–12, 14; 1412 fol. 41; 1415 fol. 28; Kuppers, "De stadsrekeningen," 8–11, 20–22, 35, 48–49, 61, 83, 124.

16 Bragard, "Soldats et jardiniers," 95–96; Bragard et al., *Namur et ses enceintes*, 42; de Groot, *De stadsrekeningen*, 1377 fol. 6; 1400 fol. 7; 1408 fol. 9; Marchal, *Inventaire*, 155; Moreau, *Bolwerk der Nederlanden*, 128; Pagnotta, *Les églises fortifiées*, 21–23; Rizzo, "La prévôté de Marville," 28; van Nispen, *Willemstad*, 36.

Figure 10. A knight errant encounters a hedge made of shrubs and spiked heads, miniature from a *Lancelot-Grail* manuscript made in Verdun or Metz, late thirteenth century (Paris, BnF, MS français, 344: *Roman arthurien*, fol. 388r).

willows on the slope next to its moat in 1507–1508. This corresponds closely with the known length of its walls; about twelve hundred and twenty-nine metres.[17]

It is precisely this maintenance argument, aside from the resistance to artillery fire, which led famous engineers such as Daniel Specklin (1536–1589), Sébastien Le Prestre de Vauban (1633–1707), and Henri-Alexis Brialmont (1821–1903), to recommend their planting. Thorn bushes in particular performed a similar function to barbed wire, and it is illuminating that the demise of hedges, first in military contexts (late nineteenth century), then in agriculture (mostly after the Second World War) corresponds closely to the latter's adoption.[18] Jean d'Haynin, a nobleman from Hainaut, obtained first-hand experience of hedges' defensive value during the Burgundian invasions of the Prince-Bishopric of Liège in 1466–1468, and later wrote down a description of these encounters in his memoirs. According to this exceptional witness account the hedges were

17 Maes, *De geschiedenis van Bree*, 2, 21.

18 Belonje, "Beplantingen," 91–94; Boosten, Jansen, and Borkent, *Beplantingen*, 36–39; Brialmont, *Etudes sur la défense*, 1:167, 1:325; de Vauban, *Traité*, 26–27; Jordan, "Grün in Festungen," 101–2; Netz, *Barbed Wire*, 23–31, 56–63; Speckle, *Architectura*, 27r, 31r, 108v, 109r.

eventually overcome, but only after the soldiers dismounted, and they had great difficulty getting through (once they even had to use ladders). Hedges seem to have been especially valuable as anti-cavalry obstacles in open landscapes, such as Hesbaye, but d'Haynin also mentions that the villagers of Loverval, near Charleroi, turned their woodlands into more effective barriers by constructing hedges (*les bois estoie hayes*).[19]

It is possible that events similar to those described by Jean d'Haynin found their way into literary works as well, for tales of medieval romance are enduring testimonies to the efficacy of these hedges (see figure 10). In the famous *Roman de la Rose*, from the second half of the thirteenth century, the narrator fell in love with a rose that grew in an enclosed garden protected by a thorn hedge, and later had to rescue her from the fortress where she was held prisoner. It served as a major inspiration for the *Roman de Perceforest*, probably written in the County of Hainaut in the early fourteenth century. This remarkable story tells of the deeds of a knight errant who also had to pass through thorns and dense woodlands to reach his beloved. It is one of the oldest written versions of the fairy tale later known as "Sleeping Beauty."[20]

Hedges are one of the most important, but not the only, type of fortification that is often overlooked because it does not fit well into the traditional military–civilian dichotomy. Many churches in the Meuse Region were also fortified, a logical consequence of their role as ultimate refuge.[21] Relatively large numbers of such fortified churches have been preserved in the southern half of the Meuse Region, but they existed elsewhere as well. The city accounts of Grave record, for instance, that its citizens besieged the church of Herpen in 1463. Some churches had defensive value that went beyond mere local defence, as in 1408, when John the Fearless, duke of Burgundy (1404–1419), insisted during the peace settlement with Liège that the walls of all fortified churchyards located next to the Sambre had to be demolished, which is difficult to understand if they were mere refuges for the villagers.[22]

The use of fortified mills, and forges, is even more poorly understood than that of fortified churches. Mills were a prime target for raiders because they had a crucial socio-economic function, represented wealth, and their supply of water or wind energy made them stand apart of the rest of a settlement. In 1397, for example, Willem I Duke of Guelders and Jülich (1377/1393–1402), attempted to destroy a windmill built on top of a bulwark outside the gates of 's-Hertogenbosch, but retreated when one of his knights was shot down. To save face he then burned a windmill that stood unprotected outside one of the other gates.[23] Forges were vulnerable because of their role in arms

19 Haynin, *Mémoires*, 1:138–39, 1:161, 1:223, 1:225, 1:226, 1:233, 1:235–37. See also Froissart, *Chroniques*, 3:35–36.

20 Bryant, ed., *Perceforest*; Horgan, *The Romance of the Rose*.

21 Genicot, *Les églises mosanes*, 276–303; Girardot, "Les forteresses," 7, 17–29, 38–44; Harrison, *Castles of God*; Pagnotta, *Les églises fortifiées*; Rousseau, "Tours domaniales"; Rousseau, "A propos de la recherche de la sécurité"; van Helen, *Rymkronyk*, 130; Wright, *Knights and Peasants*, 102–15.

22 Grave, SLC, Archief Gemeente Grave, inv. no. 218, fol. 135v (transcript Rien van den Brand, http://www.scriptoriumempeje.nl); Chevalier, "Les 'attres' fortifiés," 37–41.

23 van Boendale, *Brabantsche yeesten*, 2:341 (book 6, vv. 9907–9929).

production, and their need for running water. Fortifying both mills and forges could thus become a valid option in times of insecurity. The most conspicuous are two of the largest forges in the Meuse Region, those of Nouzon, near Charleville, and Ster (Vaux-sous-Chèvremont near Liège), which accommodated small garrisons in the seventeenth and eighteenth century.[24] Perhaps the most striking case is the so-called "Tomp," a fifteenth-century windmill in the north of the Prince-Bishopric of Liège (at Achel). This structure was studied as a noble tower for decades, simply because it included obvious defensive features (gun slits, a hedge/fence, and a ditch).[25]

Noble houses ("castles") certainly constitute one of the most archetypical fortifications, but here similar confusion exists. First of all, relatively few such noble houses resemble the classical castle as traditionally depicted. Jacques de Hemricourt, a nobleman from Liège, wrote in the late fourteenth century a history of the famous feud between two of the most powerful noble families in the Prince-Bishopric: the War of d'Awans and de Waroux (1297–1335).[26] In this book he makes a distinction between three types of noble houses: a fortress (*forteresse*), a tower (*tour*), and a simple house (*plat maison*). The first corresponded closely to the stereotypical medieval stronghold, while the others refer to simpler structures. It is in fact unclear whether a *plat maison* could be considered as a fortification at all.[27]

Still, even the smaller types of noble house, which were also the most common, had some defensive worth. The Dutch/German word for a manor house with a tower, a *blokhuis*, is the same term used to describe temporary fortifications built from the thirteenth to the mid-sixteenth century during armed conflicts to either block access to a besieged city or fortress, or control traffic on a major river such as the Meuse.[28] A fourteenth-century book of fiefs from the County of Loon, for example, mentions in 1367 *unam assisiam, cum una turri dicta vulgariter blockehuys*, located near the village of Millen, close to Maastricht. It is likely that when the Count of Loon agreed to participate in the siege of Gripekoven, near Roermond, in 1354, and provide thirty men-at-arms and thirty crossbowmen as garrisons for two *blokhuizen*, that these structures were closely modelled on such noble houses.[29] The major difference being that they were typically made of wood rather than stone. Fiscal accounts suggest that their defences included ditches, fences, and *gabions*. At least one sixteenth-century *blokhuis* also comprised a drawbridge. They might have ressembled both the *bastilles* of the Hundred Years

24 Adriaenssen, *Staatsvormend geweld*, 59–60; Barbe, Laverdine, and Parizel, *Moulins*, 16–17; Bertrand, "La forge"; Desbrière, *Chronique critique*, 118–19; Douxchamps-Lefèvre, *Inventaire*, 4:172; Gaier, "La fonction," 766; Gaier, *Art et organisation*, 243, 250; Hansotte, "L'industrie métallurgique dans la vallée de la Vesdre," 183; Langlet, "La forge fortifiée"; Marchal, *Inventaire*, 167; Matthieu, "Construction d'un fort avancé"; Rizzo, "La prévôté de Marville," 28.

25 Claassen, *Van mottoren tot kasteel*, 27–34; Doperé and Ubregts, *De donjon*, 130.

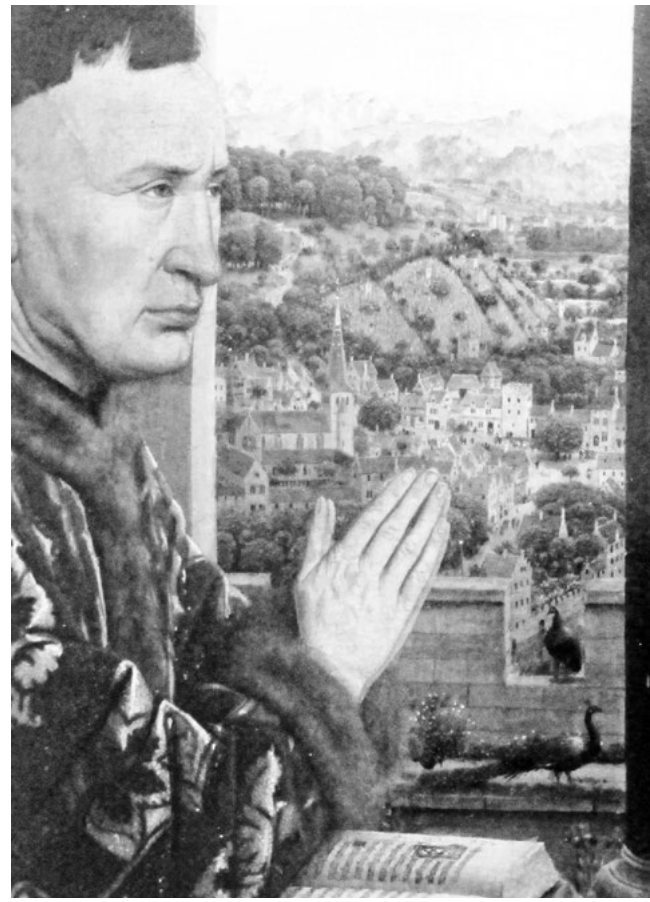
26 de Hemricourt, *Traité*.

27 Coulson, *Castles*, 42–63; Genicot, ed., *Les tours*, 31–38.

28 Girardot, "Les forteresses," 29–38; Laurent, *Aachener Stadtrechnungen*, 291; Waale, *De Arkelse oorlog*, 129.

29 de Borman, *Le livre*, 55–56; Ennen, *Quellen*, 394–95.

War, and bastions (bulwarks, *bolwerken*, *boulevards*) built to defend gateways in the Late Middle Ages (the word *blokhuis* was often used interchangeably with *bolwerk*).[30]



These *blokhuizen* played a similar role to the motte-and-bailey castles made during military campaigns in the eleventh and twelfth centuries, and the earthen forts (*sconces*, *schansen*, *Schanzen*, or *redoubts*) constructed from the late sixteenth century onwards.[31] All these fortifications have in common that they can be built relatively quickly, and that their construction mainly requires the presence of large numbers of semi- or unskilled labourers. Alpert of Metz records for example that in the early eleventh century Count Wichmann of Vreden ordered local peasants to make a motte-and-bailey castle on an island in a lake, which was located about two hundred paces from the Meuse River itself. This refers to the village of Boxmeer, which lies next to a dead arm of the Meuse, and a Roman road connecting Nijmegen with Cuijk. Wichmann's fortification was taken and demolished shortly after its construction, but the location retained major strategic value. A *blokhuis* situated at Boxmeer was besieged in 1284 by the count of Holland, and again in 1365 by the duke of Brabant, because its owners exacted toll from merchants travelling along the Meuse. Habsburg forces partially demolished a castle built on this same location in 1572 and 1590.[32]

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30 Douglas Smith and DeVries, *The Artillery*, 341; Hanssen, *Inventaris*, 24–26; van Zuijlen, *Inventaris*, 1:xi-xii, 1:91, 1:94, 1:97, 1:261, 1:279, 1:441, 1:497, 1:507, 1:513, 1:523, 1:557; Waale, *De Arkelse oorlog*, 185–90.

31 Creighton, and Wright, *The Anarchy*, 51–73; Raynaud, ""Défenses annexes"; Rogers, *Soldiers' Lives*, 95.

32 Alpertus Mettensis, *De diversitate temporum*, 710–11; Aarts, "'Montferland' en de consequenties," 34–37; Bachrach, "Civilians and Militia"; Burgers and Dijkhof, eds., *De oudste stadsrekeningen*, lxxviii, 30–31; van Helen, *Rymkronyk*, 108.

Figure 11. Madonna and chancellor Rolin, early fifteenth century (detail). Painting by Jan van Eyck. Paris, Musée du Louvre; reproduced by Directmedia Publishing GmbH). Note the peafowl in the foreground, whose presence in castle contexts is also attested archaeologically.

Broadening our definition of the range of structures that functioned as fortifications is only the first step. In order to come to a better understanding of army–ecosystem interactions at a landscape level, we need to consider them as elements in larger defence systems rather than as isolated points of resistance. Creating systems or networks of defence, that is organizing communication and cooperation between the defenders of individual fortifications, adds to the strength of the whole. In ideal circumstances defence systems ensure that the entire landscape works against the enemy. Given that the establishment of such defence systems is well known for early modern and nineteenth-century states (such as the Hollandic Water Line or Vauban's *pré carré*) this chapter emphasizes their functioning in the absence of permanent armed forces.[33]

33 See also Strickland, "Securing the North."

From the eleventh century onwards the most important, most elaborate fortifications, the very core of defence systems, were invariably made of stone. Stone stood as the preferred building material because of its durability and resistance to the two most common assault techniques: setting fire and breaking down obstacles with an axe.[34] Fire in particular presented a very serious threat: fiscal accounts from castellans and urban councils demonstrate that the roofs of towers and gates in major fortresses, such as Valkenburg, and prominent cities, such as Maastricht, were made of straw until well into the fifteenth or sixteenth century.[35]

The Meuse Region itself was a well-known centre of stone production. The Meuse valley from Givet to Maastricht more specifically had a good reputation for the quality of its limestone, and it was transported along the Meuse. A few isolated shipments ended up as far as Utrecht and Frisia. River cobbles, silex, schists, or sandstone provided the main alternatives, sandstone being especially common in the Eifel and Ardennes. Because land transport was so expensive such natural stone constituted only a relatively small part of building materials, bricks being the main component of most stone structures. However, since bricks were generally made from local materials, many of these can be considered calcerous as well. Fortresses located on rocky hilltops, such as Poilvache or Valkenburg were simply built or expanded by broadening the moat.[36]

The background of a well-known fifteenth-century painting, "Madonna of Chancellor Rolin," shows various stone fortifications (fortresses, city walls, a fortified bridge) scattered throughout a landscape, which is centred on a major river (see figure 11). It is possible that the artist, Jan van Eyck, who came probably from Maaseik, had his native region in mind when he created this work of art. Jean Lejeune has identified the stone bridge as the *Pont des Arches* of Liège. This bridge, fortified by a massive gateway, existed from the eleventh century until its destruction by massive flooding of the Meuse in 1409. It protected the city's core from the district on the right riverbank, Outre-Meuse, which lacked city walls until the thirteenth century.[37]

The landscape created by Jan van Eyck is more or less fictional, as one of the city's towers is based on the Dom Tower in Utrecht, but actual defences in the Meuse Region might still have looked quite similar to it. The paintings of the brothers van Eyck are indeed famous for their realism and detail. This depiction of a river valley is significant, because it shows that fortifications have to be considered as part of larger defence systems rather than as individual structures. A similar emphasis on landscape control

34 Raynaud, *A la Hache!*, 346–49.

35 Grave, SLC, Archief Gemeente Grave, inv. no. 217, fol. 17v; *Informacie up de staet faculteyt ende gelegentheyt,* 464; de Groot, *De stadsrekeningen*, 1385 f. 21, 1388 f. 8, 1398 f.10, 1403 f.12, 1407 f. 17; Genicot, ed., *Les Tours*, 92–94; Kappelhof, "De heren en drossaarden," 24–25; Marwede, *Die Befestigung*, 36–38; Moreau, *Bolwerk der Nederlanden*, 95–96; Uitterhoeve, *Burg Rode*, 14.

36 Coenen, "Een kasteel," 61, 66; Doperé, "Steengroeven," 102–10; Genicot, ed., *Les Tours*, 78–82; Marwede, *Die Befestigung*, 17–21; Moreau, *Bolwerk der Nederlanden*; Mourroux, "Stenay, ville militaire," 44; Olson, "Medieval Stone Production," 189–208; Rhoen, *Aachen*, 124–31; Roosens, "Habsburgse defensiepolitiek," 262–63, 346; Silvertant, *Valckenborgh*, 87–89, 95–107.

37 Henaux, "Note sur le pont des Arches."; Lejeune, *Les Van Eyck*, 127–31, 154–55; Snyder, "Jan van Eyck."

existed in the small city-state of Aachen, where the watchtowers in the *Landwehr* stood in direct visual contact with the towers of the city walls. The inclusion of visual control, reminiscent of the original meaning of the term landscape (land-scape: a view, or scenery of a collection of lands), is necessary to understand individual fortifications as parts of networks, not to be seen in isolation from other ways of communication.[38]

Once a threat was identified and located mobilization of defending forces generally occurred through sound.[39] Horns, drums, and gunshots could all raise the alarm, but none of these instruments could rival the importance of the *bancloque* or *stormklok*, kept in the bell tower of a parish church, belfry, or fortress, to assemble the ban's population in case of alarm (some villages did not have a *bancloque*, but instead sounded all church bells at the same time). When this bell called all able-bodied adult males had to assemble and prepare to either defend the settlement, pursue criminals, or put out a fire. This bell was also the heaviest and largest one because its sound needed to carry across the entire territory of the ban (its "soundscape"). The reach of the *bancloque* corresponded to the limits of the ban's jurisdiction.[40]

Organizing systems of defence was rarely such a straightforward process, however. Authority over Maastricht for instance was shared between the duke of Brabant and the bishop of Liège, and to make matters even more complicated the city's hinterland included several imperial immediacies, lordships that were held directly in fief from the emperor. When Maastricht became involved in a conflict between Brabant and Jülich–Guelders in 1396, the city council made known to several lords in the area (those of Kortessem, Stein, Elsloo, Rekem, Neerharen, Born, Pietersheim, and Mopertingen) that if any raiders passed through their lordships, they had to sound the bells and pursue them, or the city would recompense itself double for the damage done by confiscating their goods or those of their subjects, and taking them prisoner. The lords in question were fiefholders of the duke, and some might have been citizens of Maastricht, but theoretically the city had no authority to command them.[41]

This order, while threatening, was not an isolated incident, for both cities and rulers did their best to convince more or less independent lords or village communities to cooperate with them and join their defence system. A classic example are agreements between a particular nobleman on the one hand, and a ruler or city on the other, which stipulated that the former would provide armed service when required, or that the latter could treat his fortress as an "open house," meaning that they had access to it during

38 Huyskens, "Stadtbefestigung," 186. See also Bertrand, "Les trois tours," 1–7, 16–18; Guénoun, "Deux edifices," 83, 85.

39 Desbrière, *Chronique critique*, 31; Sabron, *De oorlog*, 2:32–33, 2:xv; Unger and Bezemer, *Oudste stadsrekeningen*, 50; van Mastrigt, *Willemstad prinsheerlijk*, 79, 158–59; van de Venne, *Het beleg*, 20.

40 Becquet, "Montaigle," 123–24; Berens, *Territoriale Entwicklung & Grenzbildung*, 140; Jacobs, *Justitie en politie*, 161; Kaisin, *Annales historiques de la commune de Chatelineau*, 94; Sartelet, *La principauté*, 67.

41 van der Eerden-Vonk, *Raadsverdragen*, 218–19. See also Coun, "Een Middelnederlandse rol" and Koreman, *De stadsrekening*, 98, 108–9, 116, 118, 120.

armed conflicts.[42] Yet such contracts invariably included caveats that a nobleman could not be forced to fight against a ruler to whom he owned fealty, a consideration of particular importance in the politically fragmented Meuse Region.[43]

At the other end of the spectrum, cooperation between the different elements that constitute a premodern territory could not be taken for granted. The numerous messages that rulers, cities, and individual lords sent to one another in wartime, payments for which appear regularly in accounts, certainly give a perception of regular cooperation and communication, but defence primarily remained a local matter.[44] The town of Tongres (Tongeren in Dutch) for instance refused the bishop's soldiers entry in December 1566, and only acceded to its ruler's demands after extended negotiations, during which he promised to pay for their upkeep.[45]

While cities and noblemen had good reasons to fear loss of autonomy and status, it was the mass of lowly peasants that paid the heaviest price. The duke of Bar instituted a policy of *traire à forteresse* in the mid-fourteenth century, meaning that the rural population had to seek refuge in fortresses with their movable belongings in case of attack. This reinforced their dependency on local lords and undermined the relative increase in status and autonomy they had gained during the preceding period. In exchange for protection during a period of insecurity, the Hundred Years War, they were forced to perform labour duties typically associated with serfs: maintenance work on a ruler's fortress, notably cleaning the moat, and delivering certain supplies, such as wood, free of charge. Some also had to perform guard duty. The significant development is thus that obligations that had previously been bought off now had to be performed physically again, or were now being imposed for the first time.[46]

In 1402 the villagers of Vaux-la-Grande started a lawsuit against Amé de Sarrebruck, lord of Commercy, because he forced them to perform guard duty in his fortress. The villagers argued that Commercy was not part of the kingdom of France, that the road was long and led through woodland (the village lies about fifteen kilometres southwest of the town), and that they had their own fortified church. Their opponent responded that Commercy was an important city on the frontier, and that its security was in the king's interest. Furthermore, the villagers were not allowed to turn their church into a fortress, it could only serve as a refuge during a raid.[47]

The southern half of the Meuse Region was hardly unique in this (re)imposition of labour duties. The Habsburgs and the bishops of Liège similarly ordered peasants to

42 Girardot, "Les forteresses," 44–55; Laurent and Quicke, *L'Accession*, 382; Noordzij, *Gelre*, 143–45.

43 Burgers and Damen, "Feudal Obligation or Paid Service," 788.

44 Deloffre, "Guerres et brigandages"; Dinstühler, ed., *Die Jülicher Landrentmeister-Rechnung*, 60–75; Gentenaar and Hupperetz, "Personeel en werkzaamheden," 187, 210–13; Roosens, "Habsburgse defensiepolitiek," 94–100; Ward, "Holland," 185–89.

45 Tongeren, SAT, Resoluties, inv. no. 2, fols. 262, 264v.

46 Bar-le-Duc, ADM, B 1879, fol. 131r; 1907, fols. 2–3; Coulson, *Castles*, 285–90; Girardot, "Les forteresses," 9–16; Girardot, *Le droit et la terre*, 2 :474–78; Servais, *Annales historiques du Barrois*, 1:96, 1:178, 1:261; Villa-Sébline Nicole, *La sénéchaussée*, 190, 192.

47 Luce, *Jeanne d'Arc à Domrémy*, 21–23.

help expand or maintain the fortifications of nearby fortresses and cities during the fifteenth, sixteenth, and seventeenth centuries. The temptation to use them as a cheap source of manual labour simply proved too great.[48] A notarial act from Maaseik from 1697 lists the complaints of villagers from Haelen, Buggenum, Neer, Heythuysen, and Ophoven, who all had to provide manpower to defend the castle of Horne (the seat of this small county). Most villages had to supply guards, except for Ophoven, which was located at considerable distance and instead had to clean the castle's moat and ponds once a year. Apparently, they now had to obey a new castellan who demanded six guards instead of four, made them stay day and night instead of soley acting as night watchmen, and tripled the fine for disobedience. Moreover, the guards now had to bring their own firewood, and often had to perform chores, such as helping with the harvest, with just one man standing guard.[49]

Such misuse of military obligations encouraged rural populations to maintain or expand their own defences, especially fortified churches, which gave them stronger leverage to refuse newly imposed obligations, but also weakened the organization of defence systems. It is precisely because of its unpopularity that arrested vagrants or beggers were increasingly forced to construct or maintain fortifications from the mid-sixteenth century onwards (see chap. 4). It also reveals the difficulty of organizing and sustaining defence systems in the absence of permanent armed forces.

The imposition of labour duties reflects a fundamental but often overlooked problem: that of maintenance. Every man-made structure will eventually disintegrate due to a combination of factors: decay of organic materials, impact of weather and climate, and processes of ecological succession. Ecological succession refers to phases of vegetation growth, which follow each other after a disturbance, in this case the building of a fortification, until a climax point is reached. In Western Europe this climax stage consists typically of oak-beech forests. If a stone wall is not maintained, soil will start to accumulate on the wall's surface, and in cracks and fissures. This in turn allows different kinds of plants to establish themselves, first grasses and herbs, then woody plants. Their root system adds to the destabilizing of the wall until only ruins remain. Moats filled with stagnant water likewise become shallower over time due to the accumulation of soil and the growth of plants such as reeds.[50]

The results of archaeobotanical research carried out in the former fortress of Lomprez (Duchy of Luxemburg) are very informative in this regard. We know from the

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48 Arnhem, GA, Hertogelijk Archief, inv. no. 1580, fol. 11r; Bodard, ed., *Receuil des ordonnances du Duché de Bouillon*, 30, 44, 53–54, 82, 85, 87–88; Cuppens, "Opoeteren," 327–30; de Waha, "Château et village," 423–26; Driessen, *Emundt van Oeteren*, 653–54; Gillessen, ed., *Die ältesten Kellnereirechnungen*, 98; Habets, "Costumen," 167–70; Hasquin, *Une mutation, le "Pays de Charleroi"*, 231; Hoppenbrouwers, "Een middeleeuwse samenleving," 16, 590–91; Kaisin, *Annales historiques de la commune de Chatelineau*, 92, 113, 199; Lefebvre, "Bastogne," 338–39; Roosens, "De invloed van de vestingbouw"; Van den Brand, "Spaanse vestingbouwwerkzaamheden," 82–83; von Below, "Die Leistungen."

49 Hasselt, RAH, Notaris Claessens 1663–1702 (microfilm no. 1462274, item 5) fol. 616: act June 16, 1697.

50 Peeters et al., *Sloten*, 51–55; Segal, *Ecological Notes*, 46–47, 67–75.

chronicler Jean de Stavelot that this house was burned down and abandoned in 1445. Only twelve men defended it. Pollen research now reveals that the banks of the moat originally, in the fourteenth century, supported relatively little vegetation, and that vines and fruit-bearing trees (common walnut and hop) grew close to the moat, presumably in a garden. Over time, aquatic plants, such as meadowsweet (*Filipendula ulmaria*), gave way to weeds such as redschank (*Polygonum persicaria*), which means that the moat turned into land. This process occurred gradually at first, and then accelerated, possibly in tandem with the abandonment of nearby agricultural fields and the use of the moat as a watering trough and for disposing waste.[51] These results can be compared to a study of plant seeds in the castle of Eindhoven from the sixteenth and early seventeenth centuries. This analysis suggests that the moat was quite shallow and polluted by waste from butchering and faeces. Historical sources confirm that when the castle was attacked in 1604 the moat was only 1.26 metres deep and constituted no obstacle to the attackers' assault ladders.[52]

Medieval fiscal accounts are filled with references to the construction or maintenance of fortifications, but this does not necessarily prove that defences were well preserved. Many fortifications were so extensive, with city walls measuring several kilometres or more in length, that there was always work to be done. The accounts of Venlo note for instance that master Harman Wegge and his attendants needed 137 days to clean the city's moats in 1411. This hardly indicates regular maintenance. The city council did call upon its citizens to clean the moats in 1409, a war year, but this might not have been enough, or the work was not done properly. Cutting a plant above water level was after all not sufficient; it had to be pulled out entirely. Accounts from Maastricht, from 1399–1400, specify that the city bought a hook as well as a scythe to remove grass from the moats.[53] The cleaning of the moats of Mons was apparently noteworthy enough in 1523, also a war year, for Antoine de Lusy to include it in his chronicle. He explicitly said that the work came at great cost to the city, but that they also profited from it, because they could sell the grass. The 1581 accounts of the castellany of Longwy mention that seventy-two villagers had to remove trees and bushes from the fortress's moat.[54]

It is indeed revealing for the haphazard character of the preservation of fortifications that authorities might have not proceded with it if not for external events. Every fortification built next to the Meuse or its main tributaries ran the risk of being flooded after which repairs needed carried out, if only to prevent worse disasters in the future. In most cases, however, an imminent enemy threat provided the most convincing reason for spending money on fortifications.[55] The accounts from Venlo reveal that in 1388,

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51 de Stavelot, *Chronique*, 555; Heim, "Wellin/Lomprez."

52 Luijten, "Zaden en vruchten," 240–44. See also Gillessen, ed., *Die ältesten Kellnereirechnungen*, 98, 109, 111; Moreau, *Bolwerk der Nederlanden*, 58, 63–64, 215; Thomas, "Hygiène," 269–70.

53 de Groot, *De stadsrekeningen*, 1388 fol. 15; 1409 fol. 15; 1411 fol. 16; Koreman, *De stadsrekening*, 148, 155.

54 Bar-le-Duc, ADM, B 1936, fol. LXIXv; de Lusy, *Le journal*, 218.

55 Bodart, *Société et espace urbains*, 123; Boonen, "De Maaseiker wallen," 52, 58; Driessen, *Emundt van Oeteren*, 656; Kuppers, "De stadsrekeningen," 8–11, 22, 33–39, 220; Lamort and

when a French army attempted to invade, the Count of Jülich sent four knights to inspect the defences.[56] The cutting of wood in the *Landwehr* that defended the frontier between the Duchy of Limburg against attacks from the Prince-Bishopric of Liège had always been a punishable offence, but in 1468, when Duke Charles the Bold was at war with Liège, an offender risked capital punishment and the confiscation of his possessions, instead of a heavy fine of six Rhenish florins.[57]

Enemy threats thus ensured that military needs came to dominate structures that normally served multiple purposes. The town of Grave, for example, leased several of its towers and gates to private citizens in the fifteenth century. A 1452 contract, copied into the urban accounts, specified that a widow and her son could rent the tower and associated land located next to their own house on condition that they constructed a slate roof. The town reserved the right to take full control over the tower again in case of war.[58] In an agreement from 1480 the city council of Maastricht similarly let a section of the city wall of Wijck, the part of the city that lay on the eastern riverbank, for four years to a citizen, who could fish in the moat, and pollard the willows.[59] These willows served as sources of wood, and their roots stabilized the soil. The fact that some towers were named after individual guilds (such as the Lakenmakerstoren in Tongres/Tongeren) suggests that in some cases the latter were responsible for maintenance or defence of specific stretches of the city wall.[60]

Private citizens also owned gardens or fields next to the walls and made posterns to allowed them to go in and out the city without having to pass through one of the main gates. It goes without saying that such entrances had to be filled up with solid masonry if there was any threat of an attack.[61] This in turn created different problems. A municipal act from Namur, dating to 1430, when troops from Liège invaded the county, indicates

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Huguenin, *Chroniques*, 539–540; Lhoist-Colmon and Gabriel, "La colline," 25, 28; Liégeois, "Compte de la recette de Chiny," 147, 152; Moreau, *Bolwerk der Nederlanden*, 79, 160; Soetaert, *Inondations urbaines*, 33, 36–37; Unger and Bezemer, *Oudste stadsrekeningen*, 63–64, 66; van den Brand and Manders, *Vesting 't Genneperhuys*, 386–87.

56 de Groot, *De stadsrekeningen*, 1388 fol. 8.

57 Yans, *Histoire économique*, 106. See also Geldern, Stadtarchiv, A, no. G9, Stadtrechnung, fols. 140r, 177 (1590–1591) (transcript Rien van den Brand); Tongeren, SAT, Resoluties, inv. no. 1, fol. 184r; inv. no. 2, fols. 211v, 266v–267; Bormans, "Table des régistres," 12:13; Buchin, "Erard de La Marck," 70; de Groot, *De stadsrekeningen*, 1403 fols. 8, 12; 1409 fol. 15; Roland, ed., "Chronique Namuroise," 120–21; van der Eerden-Vonk, *Raadsverdragen*, 234, 238.

58 Grave, SLC, Archief Gemeente Grave, inv. no. 217, fols. 194r, 220r, 263r; inv. no. 218, fols. 34r, 43r, 54r, 131r.

59 W.G., "Verpachting."

60 Grave, SLC, Archief Gemeente Grave, inv. no. 218, fols. 16r, 24v, 49v, 91r; Bormans, "Table des régistres," 11:270; Koreman, *De stadsrekening*, 148, 154–55, 157, 164; Kuppers, "De stadsrekeningen," 20, 34, 35, 48, 49, 69, 70, 72, 92, 123, 124, 235, 283, 296, 316; Piérard, *Les plus anciens comptes*, 1:573–76.

61 Grave, SLC, Archief Gemeente Grave, inv. no. 217, fol. 90v; Bormans, "Table des régistres," 12:13; Douxchamps-Lefèvre, *Inventaire*, 2:271; 3:335, 3:348, 3:363: 5:87; Gaier-Lhoest, *L'évolution topographique*, 48–53; Moreau, *Bolwerk der Nederlanden*, 8, 13, 30; Sartelet, *Mézières*, 12.

that waste kept piling up alongside three houses on the city wall, because the nearby postern had been closed.[62] A surviving copy of a 1396 charter kept in the archives of the bailiwick of Alden Biesen demonstrates that the city council of Maastricht went a step further and granted the Teutonic Order custody over one of the city gates, located within the gardens of the bailiwick. This privilege still applied in 1784 when the chief engineer of Maastricht ordered his assistants to investigate how a sortie, a small gate, in the commandery's orchard could be secured without violating the institution's rights.[63]

Responsibility for the upkeep of fortifications lay with bodies or individuals who, at least theoretically, were concerned with the common good. This involved the upholding of law and order, as well as socio-economic concerns and public health. It is unlikely that urban councils, castellans, or high bailiffs would have given priority to military matters above all others unless a specific threat gave them a good reason to do so.[64] The use of fortifications for other functions besides warfare can be considered as a practical way to ensure basic maintenance. It also means that a considerable part of maintenance work does not appear in fiscal accounts. Gateways and towers typically became living spaces for gatekeepers, gunners, or watchmen, and served as storage places for gunpowder and prisons. Some were even used to store archives (such as a tower in Namur castle). Because urban councils kept fish in the moats or allowed the construction of water mills some citizens had an incentive to clean and deepen the ditches.[65] A thirteenth-century charter from Liège shows that the city council leased part of the moat to a private citizen on condition that he made sure it remained at least two metres wide.[66]

This ambiguity is mirrored in the contested presence of animals in or near the fortifications. The accounts of Rotterdam from the year 1426–1427, for example, include a payment for the making of a fence to prevent livestock walking on the walls.[67] This suggests that a considerable part of the city's fortifications was still composed of earth, and that citizens did not respect official regulations against the pasture of animals. Still, when Albrecht Dürer published his fortification treatise in 1527, he also suggested that moats could serve as animal parks as well as shooting ranges. Toponyms in Liège and Maastricht indicate that this advice was based on actual practice, for they imply the presence of rabbit warrens (*Tour aux Lapins* and *Konijnenberg*) in or next to the city walls.[68] These might even have inspired the miniaturists who made the Maastricht

62 Bodart, *Société et espace urbains*, 101.

63 Maastricht, RHCL, 07.E01., inv. no. 1: Guarnisoensboek, B, December 17, 1784; Grauwels, ed., *Regestenlijst*, 3:98–99.

64 Reyerson, "Medieval Walled Space," 102–14; Wurtzel, "Defense, Authority, and City Limit," 169–73.

65 Grave, SLC, Archief Gemeente Grave, inv. no. 217, fol. 232v; Boonen, "De Maaseiker wallen," 53; Bormans, "Table des régistres," 11:272 and 13:24; Bormans, Lahaye, and Brouwers, ed., *Cartulaire de Dinant*, 3:172–73; Gaier-Lhoest, *L'évolution topographique*, 44; Jacquet-Ladrier, "Vivre à Namur," 171; Moreau, *Bolwerk der Nederlanden*, 10–12, 95–96; Thomas, "Hygiène," 269–79.

66 Lemoine, "L'enceinte de Liège," 56–57.

67 Unger and Bezemer, *Oudste stadsrekeningen*, 55. See also Moulin and Pauly, *Die Rechnungsbücher*, 1:119; van der Eerden-Vonk, *Raadsverdragen*, 119, 202.

68 Dürer, *Befestigung*, D; Moreau, *Bolwerk der Nederlanden*, 84; Ulrix, "Le rempart d'Avroy."

Figure 12. Two foxes and a wolf assault a fortress built on top of a rabbit warren, and defended by monkeys. Book of Hours made in Liège or Maastricht, early fourteenth century (© The British Library Board, Stowe MS 17, fol. 244r). Reproduced with permission of the British Library.

Book of Hours (see figure 12). Many rulers, such as the dukes of Guelders, incorporated impressive menageries, which even included lions, in their residences.[69]

Archaeozoogical research is far more informative in this regard than written sources. The study of animal bones in fortress moats and waste pits has revealed the remains of animals that lived in or around these noble houses: peafowl, swans, pigeons, dogs, horses, sparrowhawks, and goshawks. Many of these species might have moved around more or less unimpeded, swans' wings usually being clipped, but birds of prey typically stayed in cages when not being involved in a noble hunt. Still, these reports also make clear that most bones found are the remains of species eaten by the occupants and did not necessarily live near the fortifications. Others might come from animals that were just killed and discarded. In the fortress of Franchimont for instance the bones of western jackdaws have been found, deposited in the early sixteenth century. This species is often treated as a nuisance animal or pest because it nests in buildings.[70]

69 Marchal, *Inventaire*, 167, 174; Nijsten, *In the Shadow of Burgundy*, 329.

70 Boone, De Cupere, and Van Neer, "Social Status"; de Jong, "Huisdieren, jachtwild, vissen en

Incidental references in fiscal accounts corroborate a general impression that unwanted animals were ruthlessly pursued and exterminated. The city of Mons, for example, paid a bounty in 1324 for the killing of an otter, which threatened the extensive fish stocks introduced into the moat. The accounts of the high bailiff of Montfort from 1397–1398 likewise indicate that someone was sent to Maastricht to buy lime for the capturing of house sparrows, which had established themselves in the fortress. The steward of Hambach (Jülich) paid a mouse-catcher for the killing of no fewer than one hundred and eight "large mice," probably rats, in 1440–1441. Two hundred years later, in 1661, the town council of Maaseik retracted its own prohibition regarding the killing of pigeons, and ordered citizens to shoot those dwelling near the city walls, because their waste damaged the ramparts.[71]

Similar remarks can be made about plants. Archeobotanical research becomes ever more important and, as argued above, provides some of the best evidence we have about plant growth in or near fortifications. Their results can be complemented with what scarce written evidence remains. An exceptional inventory of the gardens of the lordship of Chimay in 1606, for instance, lists no fewer than one hundred and twenty different species.[72] Plants that expanded beyond these controlled contexts might initially have survived relatively unscathed, but sooner or later they would be curtailed just the same. The accounts of Grave thus mention the cutting down of an elder tree that grew next to the town wall in 1453.[73] Even more revealing are payments by the city council of Luxemburg to labourers in 1445–1448, 1453–1454, and 1456–1457 for the mowing of grass, herbs, nettles, and thorns, which grew on or next to the city's (earthen) walls, and prevented guards from conducting patrols.[74] Exactly because fortifications were well integrated into people's daily lives proper maintenance was rarely an easy matter.

Imposing Military Perceptions

Fortifications were clearly far more diverse than has traditionally been claimed and have to be studied as part of larger systems of defence. Their multiple functions were simultaneously a response to, and the source of, basic maintenance problems. The logical next step is therefore to consider the reaction of armed forces to these issues: the militarizing of fortifications from the sixteenth century onwards. This eventually cre-

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weekdieren"; Gautier, Hoffsummer, and Vanguestaine, "Faune médiévale," 78; Gautier and Fiers, "Restes animaux," 87.

71 Dinstühler, ed., *Die Jülicher Landrentmeister-Rechnung*, 82–83; Driessen, *Emundt van Oeteren*, 133; Gentenaar and Hupperetz, "Personeel en werkzaamheden," 210; Piérard, *Les plus anciens comptes*, 1:185.

72 Duvigneaud and Mathot, "Description," 407–15; Luijten, "Zaden en vruchten," 241; van Haaster, *Archeobotanica*.

73 Grave, SLC, Archief Gemeente Grave, inv. no. 218, fol. 31r; Dreiskämper, "Thonis Ongewassen en Johan Copper," 113, 148; Saint-Amand, "Poilvache," 57–58; Unger and Bezemer, *Oudste stadsrekeningen*, 51.

74 Moulin and Pauly, *Die Rechnungsbücher*, 2:17, 3:60, 3:68, 3:82, 4:33, 4:100.

ated a divergence between a handful of permanent garrisons and a mass of traditional fortifications that were only militarized during armed conflicts.

In the Meuse Region, most settlements only constructed stone fortifications (fortresses, city walls, churches) after the tenth century. A handful had the advantage of being able to lay claim to continuity with a long-distant past (such as Verdun or Tongres). The most important cities in the Meuse Region—Verdun, Namur, Liège, Maastricht, Aachen, and 's-Hertogenbosch—built a series of city walls during the Central and Late Middle Ages as the population grew. It is typically the second city wall, built in the thirteenth to fifteenth century, which remained in use until the nineteenth century.[75] Given the time, cost, and effort needed to build such elaborate stone structures, it comes as no surprise that in many late medieval cities large parts of the walls were still made of earth rather than stone.[76]

This continuity between the Central Middle Ages and the nineteenth century is remarkable in light of the common emphasis on the supposedly "revolutionary" effects of gunpowder weapons on fortifications, especially in the fifteenth and sixteenth centuries. Medieval walls were not abandoned, but simply became part of early modern defences. There are in fact only two examples of major fortifications where the original medieval fortress was discarded in favour of an entirely new structure: Agimont-Charlemont (Givet, mid-sixteenth century) and Longwy (late seventeenth century).[77] The famous engineer de Vauban, who was paradoxically also the mastermind behind the reshaping of Longwy, declared in his report of the 1692 siege of Namur that medieval walls were "the best of all."[78]

This is not to deny the significant effect gunpowder weapons had on fortifications. It is meant to demonstrate that many studies about military architecture, especially those affiliated with the "Military Revolution" thesis, underestimate the continued value of medieval fortifications. Armed forces in the Meuse Region were familiar with gunpowder weapons by the mid-fourteenth century at the latest, as I mentioned in the introduction. The initial, mainly fifteenth-century, adaptations to gunpowder weaponry were relatively simple and consisted of constructing so-called *barbicans* to shield the gates from direct artillery fire, and adding bulwarks to provide firing platforms. When the effectiveness of gunpowder weapons increased, fortification design had to respond as well: by the mid-sixteenth century the famous *trace italienne*, low thick stone walls with bastions intended to eliminate blind angles, was introduced to the Low Countries.[79]

Very few settlements in the Meuse Region, however, could rely on such elaborate defences in the Italian manner; only the fortifications of Jülich, and a few new forts

75 Bragard et al., *Namur et ses enceintes*; Lemoine, "L'enceinte de Liège," 10–27; Moreau, *Bolwerk der Nederlanden*; Rhoen, *Aachen*; van Drunen, "'s-Hertogenbosch," 171.

76 de Waha, "Binche," 127–28.

77 Bertrand, "Une construction continue"; Garcin, *De Longwy et Vauban*.

78 de Vauban, *Journal*, 69–71.

79 DeVries, "Facing the New Military Technology"; Parker, *The Military Revolution*, 6–16, 26–32, 163- 67.

(such as Philippeville and Mariembourg) were built entirely in this style.[80] In most cases renewal consisted simply of adapting the old medieval walls to new demands, which meant constructing new bastions, lowering the towers to the same height as the walls, and making both walls and towers wider by building an earthen embankment behind them or filling them with earth. Lowering the walls made them more vulnerable to an assault so the moats had to be enlarged and deepened as well. These works required so much earth that household waste, manure, and soil from gardens and cemeteries were used in emergencies to fill the new defences. Practical measures thus lie at the origin of the so-called Old Dutch system of defence, which developed during the Eighty Years War, and combined earthen walls with the extensive use of water and vegetation. Such fortifications are much faster and cheaper to construct than the expensive stone walls of the Italian system, and at least as effective.[81]

The literature on military architecture is quite extensive, but surprisingly few scholars have commented on the ecological effects of these changes, or even on the widespread use of plants. Noteworthy exceptions are Philippe Bragard's and Klaus Jordan's studies on the function of plants in fortifications, which also clarify how complex the building of these earthen walls must have been. In the Low Countries labourers used special techniques to construct earthen defences, called *gazonnage* or *placage*, an important detail that is generally overlooked. These methods date back to at least the fifteenth century and consisted of constructing several layers of earth (*placage*) or grass blocks (*gazonnage*) with bundles of branches (*fascines*) in between. The earth had to be fairly thick (black) and was often filled with seeds or roots of plants in order to add to the strength of the whole. These techniques were a prerequisite for constructing walls with a slope of forty-five or sixty degrees, designed to resist both cannon balls and infantry assaults, as such steep walls cannot be constructed by simply making a mound of earth. They also required considerable cost and effort, as the actual construction had to be done by skilled artisans, and blocks of grass had to be dug from nearby meadows. Because of its complexity and cost *gazonnage* was abandoned in the late eighteenth to early nineteenth centuries, and *placage* in the later nineteenth century. From that moment on, the earth was simply piled up and grass was sown later.[82]

A second, and far-better-known element in the increased use of plants was the planting of trees on the top of the *scarp* or main wall from the late sixteenth century onwards. The most common species were field elm, linden (or lime), aspen, oak, willow, and common walnut. Gunners preferred field elm above all others for the making of gun carriages, and engineers appreciated its extensive root system. During the nineteenth century engineering treatises increasingly recommended planting Lombardy poplars and Canadian poplars, man-made varieties of the black poplar, which have a

80 Neumann, *Zitadelle Jülich*; van den Eynde, "La fonction militaire"; van den Heuvel, *Papiere Bolwercken*, 91–104.

81 Bragard et al., *Namur et ses enceintes*, 45–53; Jacobs, *Justitie en politie*, 148; Moreau, *Bolwerk der Nederlanden*, 48–59, 68–70, 124–30; Nijssen, Vanderbeken, and Wouters, *Loonse ridders*, 37–44; Sartelet, *La principauté*, 25–26, 33, 36.

82 Bragard, "Soldats et jardiniers"; Jordan, "Grün in Festungen."

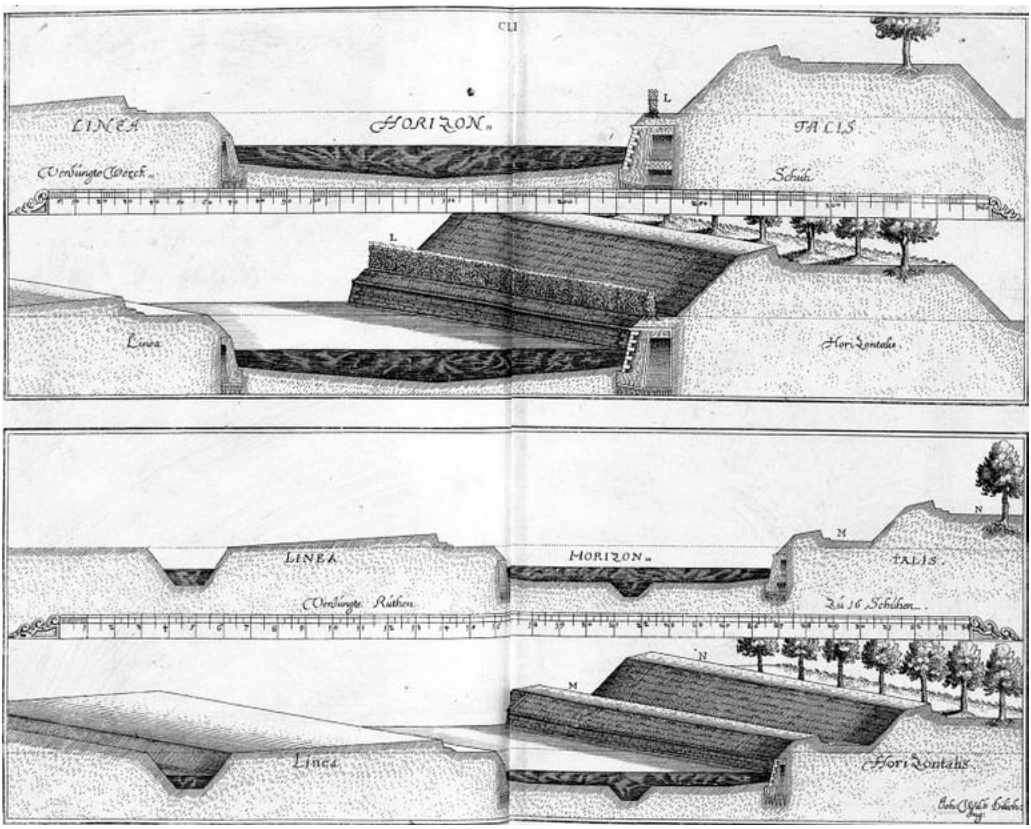

Figure 13. Schematic depiction of the planting of trees and a hawthorn hedge on an earthen embankment, 1640 (Dilich, *Peribologia*, page cli).

very straight silhouette, produced good timber, and grow relatively fast. This large-scale introduction of trees served multiple purposes: their roots reduced erosion, strengthened the wall against artillery fire, and made mining more difficult. The trees' crown denied the enemy a view of the inner city and also provided shade for guards stationed on top of the walls (see figure 13). The trunks also served as a welcome source of timber, especially since many garrisons lacked access to extensive woodlands.[83]

83 Geldern, Stadtarchiv, A, no. G9, Stadtrechnung, fol. 147r (1590–1591), fol. 221r (1592) (transcript Rien van den Brand); Maastricht, RHCL, 07.E01., inv. no. 1: Guarnisoensboek, December 24, 1771; Belonje, "Beplantingen"; Boonen, "De Maaseiker wallen," 59; Boosten, Jansen, and Borkent, *Beplantingen*, 38–43; Bragard, "Soldats et jardiniers," 97–99; Bragard et al., *Namur et ses enceintes*, 42, 51, 54, 73; Freitag, *Architectura*, 26; Hasselbrink, *Manuductio ad Architecturam Militarem*, 178–79; Jordan, "Grün in Festungen"; Lawrence, *City Trees*, 24–26; Merker, *Verhandeling*, 2:163–65; 2:100–110; Moreau, *Bolwerk der Nederlanden*, 68, 128, 152, 223; Muller, "Bouillon," 71; Speckle, *Architectura*, 27r, 31r, 108v, 109r; van Bavel et al., *De kroniek*, 400; van den Brand and Manders, *Vesting 't Genneperhuys*, 388.

Other considerations, aesthetic ones, played a role as well. When brigadier de Pichard, commander of the citadel of Liège, wanted to convince the Estates, always reluctant to spend any more on military matters than necessary, of the need to provide funding to buy trees in 1744, he mentioned in his request that field elm provided suitable wood for gun carriages. It was only five years later that another staff officer, captain Colson, who lived in the citadel and had his own garden there, arranged with one of the councillors of Liège to buy field elms and lime trees in Amsterdam, and transport them to Liège. By 1750 two hundred and fifty trees embellished the citadel, and were maintained by gardeners. Once these trees grew too big they were sold, for financial reasons, rather than cut down (1786).[84] Technological improvements thus simultaneously brought about the expansion of fortifications, and a relative increase in the use of plants, though this does not mean that military concerns always governed their exact use.

The gradual encompassment of medieval stone walls in extensive layers of earthen walls and ditches needs to be seen in the context of the history of engineering science. While master carpenters, masons, architects, and artillerymen served as military engineers throughout the Middle Ages, during the fifteenth and sixteenth century the knowledge required for such matters, especially fortress building, became so complicated that it stimulated the development of the engineer as a profession.[85] The first engineers who appeared in the Meuse Region in the early sixteenth century came from Italy. By the turn of the century the Low Countries and other parts of the Holy Roman Empire supplied engineers of their own. These men were highly sought-after specialists, but not members of the military in the strict sense of the word. Distinctions between "military," and "civic" engineers only came about in the late seventeenth and early eighteenth centuries.[86] A major dividing line did exist, however, between architects who designed or improved fortifications (*ingénieurs de places*), and officers who had experience in assaulting them (*ingénieurs de tranchées*).[87]

The development of the engineering profession was of major importance for the ways armed forces interacted with ecological systems, because it provided them with far more tools to influence landscapes, in the form of maps, drainage techniques, canal building, mining, ballistics, and similar. Local hydrography had after all exerted significant influence on the construction of medieval fortifications. The urban accounts of Geldern indicate that in the fourteenth century living hedges, as opposed to fences or a combination of hedge and fence, could only be found on the east side of the city, near the Yssumer and Gelder Tor. Given that the river Niers, which is connected to the town's moats, runs much further to the west, it is likely that the water level in this part of the moat was very low, and could occasionally even have dried up. The planting of living hedges might thus have compensated for a local deficiency of water as a barrier.[88]

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84 Liège, AEL, Etats, inv. no. 3007; See also de Ville, *De la charge de gouverneurs*, 79.

85 Purton, *The Medieval Military Engineer*, 157–64, 181–90, 213–18, 228–33, 243–44, 259–61.

86 Bragard, *Dictionnaire*; Roosens, "Habsburgse defensiepolitiek," 303–27, 411–19; Schäfer, "'Krygsvernuftelingen'," 437–60; van den Heuvel, *Papiere Bolwercken*, 6–11, 23–48.

87 Blanchard, *Les ingénieurs*, 105–14.

88 Kuppers, "De stadsrekeningen," 9, 21, 134, 147, 316; Marwede, *Die Befestigung*, 43; See also

Medieval armies did have knowledge of water management and mining, and certainly applied this during sieges (see below), but this was relatively basic in comparison to the large-scale projects early modern engineers designed. Fortresses located on hills, for example, rarely had access to running water, and thus depended on cisterns or wells. Medieval armed forces could also construct or destroy dams, dikes, and sluices for defensive purposes.[89] The castellan of Valkenburg, for instance, ordered the building of a dam in the Geul in 1465 to ensure that the water in the town moat remained deep enough during a potential siege.[90] Difficulties associated with water management probably go a long way to explain why most noble houses were located near streams or waterlogged terrain rather than hills.[91]

By the 1700s the principal fortresses in the Meuse Region depended for their defence on floodplains and moats that could be filled with water through complex systems of sluices and canals. Breaching or building dams was easy enough but allowed very little control over the extent of the flooded area, the water level, and the speed of inundation. A major turning point was thus the construction of evermore extensive systems of inundation sluices from the late sixteenth century onwards. Such devices were only effective, however, if they could be secured against enemy attacks as well as local inhabitants who opposed the flooding of their lands. The security of water management systems therefore encouraged the building of ever more fortifications, such as detached forts.[92]

From the late seventeenth century onwards, engineers also created permanent (masonry) mining galleries in a handful of fortresses (Verdun, Maubeuge, Philippeville, Namur, Maastricht). Mining was already a well-known siege technique in the Middle Ages, but the spread of gunpowder made mining activities far more efficient and dangerous. These galleries were often very extensive, with those of Philippeville, which have still been preserved, measuring about ten kilometres in length. Given the general humidity of these underground constructions, small gaps were left in the walls which could be closed at short notice, as it was impractical to install wooden doors in peacetime. Ventilation shafts, some six metres in length, were indispensable as were small canals designed to dispose of the excess water. The galleries could also be used to store supplies, albeit only for short periods of time due to the humidity, and shield the defenders during bombardments.[93]

Caminada-Voorham, *Loevestein*, 52; Richer of Saint-Rémi, *Histories*, 1:94–95.

89 Becquet, "Montaigle," 125, 129; Bragard et al., *La termitière*, 54–56; Desbrière, *Cartes et mémoires*, 25; Genicot, ed., *Les Tours*, 104–6, 163–65, 177–80; Muller, "Bouillon," 44; Saint-Amand, "Les puits"; Thomas, "Hygiène," 256–64.

90 van de Venne, *Het beleg*, 40.

91 Gleue, *Ohne Wasser keine Burg*, 14–18, 25–39.

92 Gilbert, *Le siège de Stenay*, 40; Groussard, "Vauban et l'eau"; Moreau, *Bolwerk der Nederlanden*, 257–66; Nijhof and Steketee, "Sluis," 99–101; Parmentier, *Pays de Charleroi*, 92; van den Brand and Manders, *Vesting 't Genneperhuys*, 279, 320.

93 Bragard et al., *La termitière*; Moreau, *Bolwerk der Nederlanden*, 202, 283–318; Silvertant, *Valckenborgh*, 209–17.

Nevertheless, even engineers had to take into account the environmental constraints posed by the landscapes they sought to defend. Casemates, cellars, and water-filled ditches were common enough, but only two fortresses depended on both inundations and mining galleries: Verdun and Maastricht. Engineers also focused on the tributaries of the Meuse to establish inundations, because its main current proved too strong to control. The Maastricht inundation thus operated with water from the river Jeker/Geer.[94] The landscape modifications that did succeed came moreover at a very high cost of manpower and resources. The registers of the French Hôtel des Invalides give an original perspective on the difficulties faced when constructing or improving fortifications in the late seventeenth and early eighteenth century. During this period of intensive warfare thousands of soldiers became invalids, which led to writing down service records that would otherwise not have been preserved. These lists reveal that one soldier got affected with rheumatism because he spent long hours constructing sluices in Sedan, another one, a miner, fell down the rocks when making staircases for the fortress of Dinant, and many others got wounded during mine explosions because the hard underground in Givet necessitated their use.[95]

The important role of engineers in the changing relationship between armed forces and the ecosystems with which they interacted lay in their role as government representatives as well as the increased potential of landscape modification that their profession represented. By the eighteenth century appointing military engineers to oversee the preservation of fortifications had become the norm, as revealed by the administration they left us.[96] The combination of these specialists with the institution of more extensive guard systems (see chap. 4) gave military forces much more leeway in imposing their view on fortifications, and urban defences in particular. The military engineer was the "expert" who knew best how to defend a landscape, and the permanent military garrison provided him with the means to enforce his view, against the wishes of local residents if necessary.

In a minority of cases the authority of military engineers became so all-encompassing that governments charged them with tasks that had very little or nothing to do with military matters. The engineer brigade stationed in the Austrian Netherlands enjoyed a particularly high reputation, and became an important tool of government control. A typical example is the government in Brussels' order to Philippe De Laing, major-general of the engineers, to devise measures to prevent the flooding of the Meuse in the 1760s.[97] In the kingdom of France by contrast a military engineering academy was only founded in 1749–1750, later than its civilian equivalent (1747), and in the Dutch Republic control over water was even more strongly concentrated in the civilian hands

94 Moreau, *Bolwerk der Nederlanden*; Groussard, "Vauban et l'eau."

95 Vincennes, SHD, GR, 2Xy09: Jan La Plaine; 2Xy12: Claude Croissant dit La Jeunesse; 2Xy13: Jean du Bord dit St Jean, Hubert Grangé dit Beaupré; 2Xy14: Jean Du Barry dit Leytoure; 2Xy22: Jean François Bourguignon dit Jassemin, Antoine Collardon dit Comtois; 2Xy25: François Paquet dit Belmont, Jan Bap.te Mazuret dit La Tulippe (transcript www.hoteldesinvalides.org).

96 See for instance Maastricht, RHCL, 07.E01, inv. no. 1: Guarnisoensboek.

97 Breuer, "Matériaux," 342, 346, 350.

of water boards. Nevertheless, military engineers were quick to exploit opportunities created by natural disasters. In 1757, when melting ice water from the Rhine and Meuse basins destroyed dikes and flooded large areas of land, Dutch military engineers came to the aid of local governments, and simultaneously charted the regional hydrography to provide the military with a new mechanism of control.[98] Engineers played a key role in military forces' growing control over landscapes, but their efforts did not go unchallenged nor were without their limitations.

The sheer cost of and complications resulting from adaptations to fortifications have been mentioned repeatedly, but one logical consequence has been left unexamined: the fact that these changes, impressive as they were, only applied to a handful of major fortresses of which Heusden, 's-Hertogenbosch, Venlo, Maastricht, Namur, Givet, Maubeuge, Mézières, Sedan, Longwy, and Verdun were the most important. The growing gap from the sixteenth century onwards between a handful of up-to-date fortresses with permanent garrisons and the great mass of more traditional fortifications, is relatively well known within military history. The main issue is that most scholars assume that these latter defences simply lost their military value altogether.

It cannot be emphasized enough that large armed forces of thousands of soldiers with the latest siege equipment did not constitute the most typical army, even in a zone as strategic as the Meuse Region. For most people up to the eighteenth century the most common, and most direct, threat remained that of relatively small bands of raiders who stole, kidnapped, and burned, or extorted money not to do so. More traditional fortifications, well imbedded in people's daily lives, retained their effectiveness because bringing up artillery was such a complex process. It is revealing that many churches in the French *département* of the Meuse were not fortified in the Middle Ages, but only in the sixteenth or early seventeenth century, when political turmoil created a climate of insecurity.[99]

Another noteworthy example are so-called sconces or *schansen*, forts made from blocks of earth and *fascines* (the word *schans* originally referred to such a bundle of branches), which were commonly used by armed forces of a state to defend strategic routes in the late sixteenth and seventeenth century. They also spread rapidly throughout the Campine/Kempen during the Eighty Years War, as villagers had to find new ways to defend themselves, and their property. Some of the first forts appeared around parish churches, which again confirms these buildings' central defensive role in rural areas. Most, however, were entirely new constructions in the most inaccessible part of the village: marshes or heathlands. These peasant *schansen*, an acre to two hectares large, existed in peace as well as war, and were in fact miniature villages or hamlets, since some villages had several *schansen*, in which every household had a plot of land, and was obliged to help with its maintenance. They only disappeared in the late eighteenth and nineteenth century. [100]

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98 Combeau, *Le comte d'Argenson*, 323; Janssen, *Op weg naar Breda*, 50–53, 79–97; Langins, *Conserving the Enlightenment*, 94–103; Verhagen, "Het Bossche Broek," 51–52.

99 Adriaenssen, *Staatsvormend geweld*, 403–4; Girardot, "Les forteresses," 24–25; Jenniges, *Das Land zwischen Venn und Schneifel*, 83–84; Pagnotta, *Les églises fortifiées*.

100 Brunner, ed., *Reise des P. Reginbald Möhner*, 55; Hansay, "Documents inédits"; Mertens, "Kempense buurtschappen."

The spread of gunpowder did make many medieval fortifications redundant, but this was hardly the linear process traditionally presented. The diary of Splinter Helmich, a citizen from Utrecht who joined the "Sea Beggars" and participated in the taking of Den Briel, is a good example. He fought as captain of his own company in the area around Venlo and Roermond in the 1570s, and regularly encountered medieval fortresses and village churches, which were unable to resist cannon, but remained quite effective against an unsupported infantry unit.[101] In the 1700s military treatises still gave practical advice on how to adapt traditional defensive structures, such as hedges, churches, or castles, for use as field fortifications.[102] Medieval fortifications did not lose their defensive value as a result of ineffectiveness, but because violent encounters between soldiers and local residents became increasingly rare (see chaps. 3 and 4). This meant that the general population felt increasingly less pressure to maintain multifunctional structures with respect to defensive needs. So-called *fermes en carré*, built in Hesbaye during the eighteenth and nineteenth centuries, are a good example. These resemble medieval fortresses, but only functioned as fortifications in exceptional circumstances (such as the farm of Goumont/Hougoumont during the battle of Waterloo).[103]

The ongoing importance of more old-fashioned fortifications, despite the spread of ever more effective gunpowder weapons, goes a long way to explain the Prince-Bishopric of Liège's deviation from a general pattern towards the adoption of ever more extensive fortifications. The great majority of its fortresses and city walls saw few adaptations after the early sixteenth century, the citadel of Liège, constructed in the mid-seventeenth century, being the only modern fortress erected by order of the bishop. The Prince-Bishopric correspondingly retained only a handful of permanent garrisons in the medieval fortresses of Bouillon, Dinant, Huy, and Stokkem, as well as the citadel of Liège. Most of these forces were also quite small to contemporary standards: a surviving muster list of the soldiers stationed in the fortress of Stokkem in 1655 indicates that the garrison consisted of a mere forty-two men: the high bailiff, two lieutenants, and three squads of thirteen men headed by a corporal. By the eighteenth century only one garrison remained: a single infantry regiment of six hundred men housed in the partially demolished citadel of Liège.[104]

This exceptional case has its origin in the bishopric's policy of neutrality, adopted in the late fifteenth century, but is also related to the constant conflicts between the bishops and their own subjects, which made the latter reluctant to provide funds for military forces that would have given their ruler too much power. In 1636 Bishop Ferdinand of Bavaria (1612–1650) even directed the infamous Imperial general Johann von Werth against his own subjects in order to bring them to obedience. The building of the citadel of Liège was a repercussion of this open war. The downside of this policy was the Prince-

101 Helmich, *Journaal*.

102 de Cessac, *Le Guide*, 236–41, 268–71, 276–87, 289–92, 308–11, 355–68; de Clairac, *Ingénieur de campagne*; 236–354; Noizet de Saint Paul, *Traité*, 2:239–48; von Gaudi, *Feldschanzen*, 28–35, 51–67.

103 Genicot, "Les fermes en carré"; Pagnotta, *Les églises fortifiées*, 132–35.

104 Liège, AEL, Etats, inv. no. 3001–3007; Buchin, "Erard de La Marck"; de Froidcourt, "La garnison"; Lhoist-Colmon and Gabriel, "La colline," 34–39; Poswick, *Histoire*.

Bishopric's vulnerability to almost every potentate that sought to take advantage of the strategic value of the Meuse.[105]

Attempts by the Habsburgs, French monarchs, and the Dutch Republic to secure their own frontiers, their "garden," came regularly at the expense of the Prince-Bishopric: Givet, Mariembourg, Philippeville, and Bouillon were more or less forcibly ceded to Spain and France for strategic reasons, while the fortresses of Charleroi and Maastricht expanded their defences by encroaching upon the bishop's territory. When the French army occupied large parts of the principality of Liège during the Franco-Dutch War (1672–1678) they turned the towns of Dinant and Maaseik, Stokkem being considered too small, into fortresses capable of resisting modern siege artillery. When they retreated again, in 1678 in the case of Maaseik and 1698 for Dinant, they demolished everything, including large parts of the original medieval defences.[106]

Similar processes could be observed in other parts of the Meuse Region that were unfortunate enough to lay on the edges or outside the French and Dutch "gardens." The French army ruined fortifications in the Duchy of Bar–Lorraine and the Spanish Netherlands on a large scale in the second half of the seventeenth century, and the Dutch army demolished parts of the medieval fortress of Valkenburg with explosives in 1672. An undefended fortification is after all a liability rather than an asset. The maintenance of a handful of up-to-date fortresses and settlements as the only proper fortifications within military structures, with the rest being dismissed as either irrelevant or simple field fortifications, was thus not left to chance, but enforced violently. Still, since urban walls and noble houses were too large to be destroyed at short notice, soldiers just created breaches with explosives to make them indefensible. These structures eventually turned into ruins because local residents no longer looked after them.[107]

The final demise of all existing fortifications in the Meuse Region, medieval as well as early modern, originated as much in changing political contexts as in technological developments. Emperor Joseph II's wish to expel Dutch garrisons stationed in the Austrian Netherlands, a result of the so-called Barrière treaties in 1697–1715, led him to order the demolition of large parts of the fortifications of Namur in 1782. The French takeover of most of Western Europe in 1795–1814 likewise entailed the neglect of almost all remaining fortifications in the Meuse Region. The fortresses of Verdun and Givet for instance simply became gaols for British prisoners of war.[108] The creation of a new kingdom of the Netherlands and the Belgian secession fifteen years later did seem to reverse this trend, since Liège, Huy, Dinant, Charleroi, Namur, and Bouillon were refor-

105 Goorts, *War, State, and Society*; Hagendorf, *Tagebuch*, 59–62; Harsin, *Politique extérieure et défense nationale*; Lhoist-Colmon and Gabriel, "La colline," 27–30.

106 Boonen, "De Maaseiker wallen"; Bouchat, "L'occupation française"; Moreau, *Bolwerk der Nederlanden*, 242; Parmentier, *Pays de Charleroi*, 75; Roosens, Habsburgse defensiepolitiek, 122–27.

107 Engelen, "Stokkem," 81; Jenniges, *Das Land zwischen Venn und Schneifel*, 39; Kappelhof, "De heren en drossaarden," 49; Lefebvre, "Bastogne," 356; Mourroux, "Stenay, ville militaire," 37–38; Rorive, *La guerre de siège*, 199–202.

108 Bragard et al., *Namur et ses enceintes*, 69–76; Dereu, "Les armées"; Thewes, *Stände, Staat und Militär*, 85–94.

tified, but these new forts were again replaced by the Brialmont fortresses around Liège and Namur in the last decades of the nineteenth century. The Dutch army also decided to abandon the fortresses of Maastricht and Venlo in the 1860s because of their isolated position, and fell back on the New Hollandic Water Line.[109] These developments did not spell the end of vegetation in fortifications; their use was actually expanded towards the end of the nineteenth century because of an increasing emphasis on camouflage. What matters is that the thread linking medieval fortifications to nineteenth century garrisons had finally been severed.

Conserving Fortifications

Technological change in combination with an increasing distinction between armies and the general population brought about a divergence between a handful of defences that became permanently incorporated into military structures, and the great majority which were only militarized during armed conflicts or lost their defensive value altogether. So, our next object of study turns to how armed forces sought to preserve fortifications, as opposed to fortifications as multifunctional structures maintained by the general population. This focus on military management of fortifications allows the making of a comparison between their current ecological value and historical management practices.

The militarizing of fortifications, the fact that armed forces, initially just soldiers and later military forces in the strict sense of the word, took control over defensive structures, was a very gradual process. Individual watchmen and sentinels were ubiquitous in medieval fortifications, but acted as urban officials or members of noble households (see chap. 4). The first permanent garrisons only became established in the late fifteenth century.[110] The number of soldiers engaged in such garrison duty remained relatively limited, rarely exceeding a single infantry company before the late sixteenth century, and more importantly, was restricted to a handful of strategic fortresses and newly constructed forts in frontier contexts (such as Charlemont, Mariembourg, and Philippeville).

Furthermore, even though many such fortifications were closely integrated into urban defences the influence their garrisons could exert was rather small. Particularly revealing is a court record from Stokkem, dating to 1610–1612, regarding a man who built (pig)stables on or next to the walls. The high bailiff had ordered him to tear down the stables on multiple occasions, but the offending citizen claimed that his authority did not extend beyond the old medieval fortress.[111] Cities were not surprisingly very reluctant to accept garrisons, perceiving them as a threat to their autonomy, until the prolonged and large-scale wars of the late sixteenth and seventeenth centuries (in turn,

109 Bevaart, *Nederlandse defensie*, 145–53; Bragard et al., *Namur et des enceintes*, 81–93; Bragard et al., *Namur, la citadelle hollandaise*, 24–28, 112–138; Moreau, *Bolwerk der Nederlanden*, 205–17, 233–40; Neumann, *Das Ende einer Festung*.

110 Dauphant, *Le Royaume des quatre rivières*, 244–45.

111 Hasselt, RAH, Schepenbank Stokkem, inv. no. 162: Paulus Jeghers.

the French Wars of Religion, the Eighty and Thirty Years' Wars) forced them to give way. The city of 's-Hertogenbosch for instance enlisted soldiers of their own during conflicts between Brabant and Guelders in the fifteenth and early sixteenth century, but by the 1560s it had to accept the presence of Spanish soldiers sent by their monarch.[112]

Aspirations of urban autonomy did not stop with the establishment of large permanent garrisons. While soldiers could more or less impose control over the newly established earthen outworks and outlying forts, authority over the original city wall continued to be divided. This was the only part of the fortifications citizens could access, albeit with restrictions: in peacetime they could walk there during the day. The governor of Maastricht, for example, made his soldiers construct the oldest public park of the city next to its main wall in 1653. This park, which still exists, was probably built to gain the citizens' favour, but might have had the additional advantage of keeping them away from the rest of the fortifications. The records kept by the chief engineer in Maastricht reveal that he had to compensate the city council in 1741 for seven trees, which stood on the main wall, that were cut down and used as wood for gun emplacements. In December 1745 he even started an inquiry to find out to whom the trees on the walls actually belonged.[113]

Military control of fortifications ultimately rested on two pillars: the imposing of a more extensive guard system and the attribution of responsibility for fortification maintenance to (military) engineers. These engineers in their turn hired contractors to execute the necessary works. A surviving agreement from nineteenth-century Maastricht specified that plants such as rushes had to be removed from the water-filled moats twice a year, which seems like an improvement compared to earlier practices. This outsourcing of government tasks was a characteristic of early modern warfare, but also created obvious security concerns. The constructing and maintenance of underground casemates or mining galleries, the most covert elements in fortifications, thus became the prerogative of military miners during the eighteenth century, as proven by surviving reports from Namur. They were not accessible to anyone else except engineers and high-ranking officers.[114]

The increasing involvement of soldiers in fortification maintenance can also be seen in this light, although their main function seems to have been that of a cheap labour force. An early example comes from an account regarding the fortification of Geldern in 1597–1598. It includes payments to two soldiers for cutting *fascines*, and digging.[115] By the late seventeenth century soldiers regularly worked on fortifications to earn some

112 Adriaenssen, *Staatsvormend geweld*, 37, 42, 46, 111; Gudde, *Garnizoen*, 7, 13–28.

113 The Hague, NA, Raad van State, inv. no. 2057: Garnisoensorderboek, October 2, 1785; Maastricht, RHCL, 07.E01., inv. no. 1: Guarnisoensboek B, December 22, 1741, December 17, 1745; Haanen, "Het eerste stadspark."

114 The Hague, NA, Raad van State, inv. no. 2599: Records concerning the construction of casemates by miners of the garrison of Namur; Maastricht, RHCL, 07.E01., inv. no. 1: Guarnisoensboek, 9: Contracts regarding the maintenance of the fortifications of Maastricht; Moreau, *Bolwerk der Nederlanden*, 286, 289, 296, 299, 307.

115 Maastricht, RHCL, 01.002 Rekenkamer Roermond, inv. no. 385: Accounts fortification Geldern, 1597–1598 (transcript Rien van den Brand).

extra pay, either as day labourers with the contractors or under the direct orders of military engineers.[116] Particularly instructive for the low status attributed to this kind of work is that in 1748 in the Dutch army forced labour on the fortifications became the official punishment for desertion (see chap. 4).

The use of large numbers of labourers became a necessity, because of the vulnerability of these steep earthen walls to erosion. The average life expectancy of such a wall, if not maintained, was around three to four years. This explains why military authorities were so concerned with limiting access to the fortifications. A garrison order from Namur, dating to June 1714, even forbad soldiers to lie on the grass. French regulations from 1750 similarly specified that governors could not cut the grass on the walls more than twice a year, and that they had to make sure that no one damaged these structures. A garrison's staff officers were after all entitled to the income generated by the fortifications: hay production and the renting out of fisheries in the moats.[117]

Two contracts from Maastricht, dating to 1710 and 1716, reveal that a representative of the garrison commander rented a considerable part of the outworks along the river Jeker/Geer to a sheep merchant.[118] Such agreements must have been quite common, but they have rarely been preserved, possibly because officers considered them part of their private archive. Sheep are quite agile, and in contrast to cows or horses, would not have damaged earthen walls in any significant way. Other governors, such as those of 's-Hertogenbosch, cut the grass as much as possible, which in turn prompted the Dutch government to buy off their entitlements, and grant contractors the right to cut the grass instead.[119]

This renting out of the fortifications in peacetime was, unfortunately for the military officers involved, not the only remnant of medieval practices. Local residents continued to perceive fortifications as multifunctional structures, but instead of an accommodating city council, they now saw themselves confronted with an organization that had little patience for such matters. Many citizens considered fortifications as an appropriate, perhaps the only suitable, place for pasturing livestock, for waste disposal, bleaching or drying linen, fishing, and playing games.[120] The French engineer de Vauban lamented in a letter sent to the French Minister of War, Chamillart, in 1703 that the fortifications

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116 Maastricht, RHCL, 01.E01, inv. no. 1: Guarnisoensboek; Engelen, "Stokkem," 77; Kappelhof, "Les dépenses," 296–303; Rorive, *Les misères de la guerre*, 293; Van den Brand, "Spaanse vestingbouwwerkzaamheden," 84–85, 98, 108–9.

117 The Hague, NA, Raad van State, inv. no. 2079, order June 28, 1714; *Ordonnance du roi* (June 25, 1750) article DCLCIV; Vallée and Pariset, eds., *Carnet*, 82; Vermeesch, *Oorlog, Steden en Staatsvorming*, 222–25.

118 Maastricht, RHCL, 07.E01, inv. no. 40: Archief garnizoenscommandant, Pachtcontracten January 29, 1710, and May 1, 1716.

119 's-Hertogenbosch, BHIC, 178, inv. no. 188, fol. 632r; inv. no. 326, fol. 301r; inv. no. 331, fol. 20r, inv. no. 332, fol. 124r; Maastricht, RHCL, 07.E01, inv. no. 1: Guarnisoensboek B, June 1, 1756; *Ordonnance du roi* (June 25, 1750) article DCLCIV; Caminada-Voorham, *Loevestein*, 51–54; Sangers and Simons, *Geschiedenis*, 94–95, 105.

120 Caminada-Voorham, *Loevestein*, 93–94; Gaber, *Les fortifications*, 30–32; Moreau, *Bolwerk der Nederlanden*, 76–77, 149; Parmentier, *Pays de Charleroi*, 67, 79, 114.

of Namur were in a horrific state. Everyone and everything could access them at will, they were filled with gardens, and groups of dogs assembled there and chased mice and moles. Medieval walls were already closely associated with such activities, and low earthen embankments were even more appealing.[121]

Yet soldiers were also not without fault where the damaging of fortifications was concerned. Aside from fishing, hunting, and digging for loam (see chap. 4), many also created gardens in or near the fortifications. The governor of the fortress of Gennep, which controlled the junction of the Niers and the Meuse, gave two subordinate officers on May 5, 1650 permission to establish gardens in the empty space behind the guardhouse. Their example inspired others and less than a year later, in March 1651, when government representatives (*gecommitteerden*) inspected the defences, citizens and soldiers had already expanded their gardens to such an extent that in many places the walls had become too small to accommodate cannons. They had to be removed immediately, but appeared again during the 1654 and 1671 inspections.[122] This example makes clear that officers had no issue with gardens as such; they recognized the value of having access to fresh vegetables, but wanted to ensure that they did not impede defensive efforts. This meant in practice that generally only officers and military hospitals had their own gardens. Some of these would still have been quite large. The officers' gardens in the eighteenth-century fortress of Montmédy measured no less than six hundred square metres.[123]

Remarkably enough, given the importance of plants in fortifications, it is quite unclear to what extent military officers, and engineers in particular, had the minimum of botanic knowledge necessary to ensure their wellbeing. The French engineer de Cormontaigne gave some brief advice on how to remove worms and moss from the trees standing on walls in a 1741 treatise, but this was quite uncommon. The French military engineering school in Mézières, founded in 1748–1751, did not consider botany to be a very important subject, and put it only occasionally on the curriculum.[124] Some of the most detailed instructions regarding the cultivation of plants come from a journal on military engineering, which published an article on tree planting in 1829. This piece listed existing regulations applied within the garrison of Verdun, and addressed an apparently widespread concern among engineers at that time: that the planting of trees in fortifications often failed. The author, an engineering captain, blamed the carelessness and ignorance of the contractors and labourers who had to carry out this task. His own directives are relatively basic. He mentions, for instance, that plants raised in nurseries might have difficulty adapting to the soil of the fortifications and recommends

121 Bragard, *Dictionnaire*, 312–13.

122 van den Brand and Manders, *Vesting 't Genneperhuys*, 384–88.

123 Liège, AEL, Etats, inv. no. 3007; Barbe, "Rocroy," 119–20; Bragard, "Soldats et jardiniers," 87–88; Mourroux, "Stenay, ville militaire," 42; Muller, "Arlon, Bastogne, Laroche, Marche," 264; Muller, "Bouillon," 76; Sartelet, *La principauté*, 60, 61, 63; See also Ottersbach, "Der Garten in der Festung."

124 Blanchard, *Les ingénieurs*, 108, de Cormontaigne, *Architecture militaire*, 1:118–19; Jordan, "Grün in Festungen," 106–17.

specific species for different soil types. The rarity of this captain's interest in botanical matters is corroborated by the fact that his name also appears in a horticultural journal, in which he describes a rare apple variety found at Verdun.[125]

Surviving records from the nineteenth-century garrison of Maastricht confirm this impression. The stronghold, like many other large garrisons at this time, had its own plant nursery that occupied more than one acre. In the year 1824 the director of the fortifications offered a contract for the delivery of five thousand field elms, sixteen thousand willows, eight thousand birches, eight thousand alders, two thousand hazel shrubs, two thousand oaks, and one thousand beech trees. Most of these were planted as coppice wood near the Boschpoort, on the northwest side of the city. Another fourteen baskets with acorns and thornapple seeds, seven pounds of alder and birch seed, eight thousand young ash trees, and three thousand Canadian poplars had to be supplied for the garrison's nursery. Even if one takes into account the sheer size of the fortifications and that the garrison initiated a major planting program in this period, the number of plants that perished on a yearly basis must have been enormous. The year 1825 again saw the planting of at least one thousand six hundred and seventy trees (nine hundred and fifty Canadian poplars, four hundred and fifty field elms, one hundred and seventy-five ash trees, seventy Lombardy poplars and twenty-five nut trees), and the planting of forty-four thousand young trees and shrubs in the nursery.[126] Military forces considerably expanded their control over fortifications, but they never fully succeded in imposing their grip on a complex ecological reality.

Maintaining fortifications was clearly no easy matter, neither for medieval urban councils and high bailiffs nor for early modern military organizations. It was far from obvious that armies could enforce their views on how fortifications should be managed. We will now turn to the one, perhaps the only, circumstance in which military views predominated at the expense of all others: an actual siege. The term siege is interpreted here as a formal blockade of a fortification with the object of conquering it through attrition or direct assault, not a sudden attack. This means that our next focus will be on the most extensive and stereotypical fortifications: fortresses and cities.

An actual siege was a rather rare event: the cities of Maastricht and Namur, both key locations for controlling the Meuse River, experienced only fourteen and eight sieges respectively in the entire period from 1250 to 1850. This was a consequence of the difficulties associated with the transport of artillery, and the financial cost a siege entailed. An additional consideration in medieval contexts was that only a limited number of people, mostly residing in major urban settlements, had the experience necessary to construct or maintain complicated siege equipment.[127] For instance, the siege of the fortress of Sampigny in 1358 necessitated the transportation of "two large machines," and a battering ram from Verdun to Sampigny on ten wagons, thirty carts, and the mobiliza-

125 Piérard, "Instruction"; Piérard, "Rapport."

126 Maastricht, RHCL, 07.E01, inv. no. 9: Performance specifications concerning the maintenance of the fortifications of Maastricht, no. 76; Lienard, "Le fort," 103.

127 Purton, *The Medieval Military Engineer*, 184–90, 213–18.

tion of six hundred *sergents de pieds* (infantrymen) as guards.[128] When the urban militia of Aachen participated in the siege of the fortress of Reifferscheid in 1385 they had to move a trebuchet, broken down into its constituent parts, over a distance of about sixty kilometres, a task that took sixty-one horses, fourteen wagons, and five days. Reassembling and erecting the device before the besieged fortress took another six days and twelve skilled artisans, and the stones had to be specially brought from Nideggen. The burden of using this equipment was in fact so considerable that the cities of Aachen and Cologne shared the costs.[129]

When a siege did happen, however, it produced ecological effects that can only be compared to a natural disaster. At first glance, it thus appears that the only occasion armed forces could really control defence structures was also the moment their very existence was threatened. This can best be described as succeeding steps of increasing intensity. Simple preparation for an enemy attack, not necessarily a siege (see chap. 4), entailed all vegetation and structures in the immediate surroundings of a fortress or city that could benefit the enemy, such as trees, hedges, buildings, ditches, and even hollow lanes, being demolished or flattened. Such destruction initially applied to everything within bowshot range, but later to the effective reach of a gun or cannon.[130] On the night of January 25 to 26, 1407, for example, watchmen from Maubeuge observed fires near the fortress of La Buissière. One of the town's messengers went there the next day to investigate. It turned out that the fortress' occupants had set fire to the hedges and bushes around the defences as a precaution.[131] The actual carrying out of such orders must often have met with strong opposition, for resolutions of the city council of Liège reveal that mayors were permitted to enlist guards armed with halberds to accompany them on their inspection tours in 1568. We know that such defensive measures were quite often only partially performed, or even not at all, because of resistance from local inhabitants.[132]

It is precisely because of the reactions such orders generated that permanent garrisons in the eighteenth and especially nineteenth centuries imposed restrictions in peace as well as wartime. The French Republic codified and expanded existing regulations when it stipulated in 1791 that nobody could build anything within a radius of two hundred and fifty metres around the outermost defences. Structures that could be easily destroyed, such as wooden buildings or vegetation, were allowed within a radius of four hundred and fifty metres, but these could be destroyed in wartime without compensa-

128 Kraemer, "Arme et refuge," 51; Servais, *Annales historiques du Barrois*, 1:68–69.

129 Laurent, *Aachener Stadtrechnungen*, 287–95.

130 Grave, SLC, Archief Gemeente Grave, inv. no. 217, fol. 277v; Tongeren, SAT, Resoluties, inv. no. 1, fol. 291r; Boonen, "De Maaseiker wallen," 79; Hanssen, *Inventaris*, 451; Jacquet-Ladrier, "Vivre à Namur," 170; Marchal, *Inventaire*, 165; Moreau, *Bolwerk der Nederlanden*, 42, 50, 56, 102; Sabron, *De oorlog*, 1:xxv–xxvii, 2:60, 2:63; Ubachs, *Van tricolore tot driekleur*, 5; van de Venne, *Het beleg*, 15–18; van Zuijlen, *Inventaris*, 2:1001, 2:1015, 2:1055.

131 Deloffre, "Guerres et brigandages," 272. See also Gentenaar and Hupperetz, "Personeel en werkzaamheden," 186.

132 Bormans, "Table des régistres," 11:268; d'Haynin, *Mémoires*, 1:165; Larosse, "Le siege," 51–53.

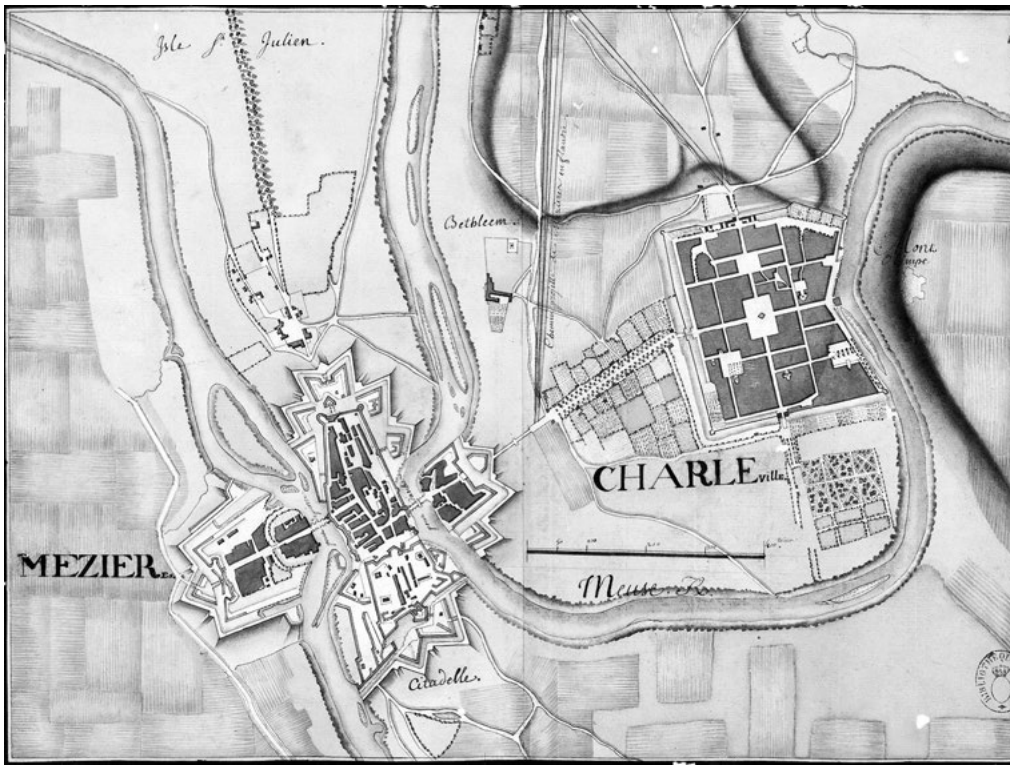

Figure 14. Military map depicting Mézières and Charleville in 1753 (Paris, BnF, Cartes et plans, GE D–14449).

tion.[133] Especially instructive of the ecological effects of such a policy is a military map from 1753, which depicts Mézières and Charleville (see figure 14). These towns have very different street patterns because the former had a medieval origin while the latter was constructed according to a set plan in 1606 by Charles I Gonzague, duke of Nevers and Rethel, as capital of his new principality. The most important difference between them is not their street pattern, however, but rather that Mézières was a key fortress in the defence of France's northern frontier, while Charleville lost its defensive value in the late seventeenth century.[134] Wide-open fields thus encircled Mézières, while Charleville counted numerous gardens in its immediate surroundings.

133 *Ordonnance Corps du Génie (1776)*, 31–32; Delalleau, *Traité de servitudes*; Muller, "Bouillon," 57; Parmentier, *Pays de Charleroi*, 77; van der Woud, *Het lege land*, 369–72, 476–77.

134 The French army initially constructed a fort (*Mont Olympe*) on the Meuse's left riverbank, opposite Charleville, to make sure the city could not serve as a stronghold against France. This fort lost its military value simultaneously with Charleville, but its remnants still appear on the 1753 map (upper right corner). Hubert, *Histoire de Charleville*.

Making sure that a potential enemy would be unable to find cover was only the first step in preparing for an adequate defence. The defenders also had to restore or expand the fortifications, store sufficient supplies, and otherwise prepare for a substantial increase in the number of occupants, man and beast, for an unknown length of time. This inevitably entailed further encroachments on nearby woodlands (see chap. 3). Two members of the garrison of Montaigle, near Dinant, received a financial reward in 1465 to remove large amounts of compost and waste from the fortress, that had accumulated there as result of the many men-at-arms who came to garrison it, in combination with the livestock brought there for safekeeping. It filled the courtyard and soiled the water of the well.[135] When Waultrin de Fillers, general receiver and forester of Longwy, organized this fortress for a potential siege in 1474–1475, he ordered the construction of a horse-drawn mill and the cleaning of the well and the latrines.[136]

The construction of horse-drawn mills, also attested in fifteenth-century Valkenburg, was a practical response to the fact that defenders could lose access to the wind or water mills they normally used. Towns and cities sometimes constructed windmills on their walls, which safeguarded them against a direct enemy attack, but still made them very vulnerable to a bombardment (see the raid on 's-Hertogenbosch in 1397 above).[137] If mills became unusable, grain could no longer be turned into flour, which effectively made available grain stocks next to useless. The Burgundian army forced Tongres/Tongeren to surrender after only eight days in 1482 by damming the river Jeker, on which the city's water mills depended. An earlier attempt by Liégeois troops besieging Maastricht in 1408 failed because the citizens constructed new water mills on the Meuse, which was too large to be diverted.[138] Military garrisons also ran into conflicts with millers because water mills slowed down watercourses, which in turn obstructed defensive inundations. The French governor of Maastricht thus forbad the millers of Tongres/Tongeren to work in July 1678 until the inundation of the fields to the south of Maastricht, which also depended on the Jeker, was complete.[139]

Inundations were a regular feature of many sieges, and as argued before, became increasingly complex through the involvement of engineers. One of the most famous engineering feats was the siege of 's-Hertogenbosch in 1629, where Dutch engineers nullified the defenders' main ecological advantage: the waterlogged soil around the city, aggravated by the deliberate inundation of the rivers Aa, Dieze, and Dommel. The besiegers built twenty-one horse-drawn mills, connected them to the inundation by special canals, and then drained the area surrounding the fortress. They also rechanneled the Aa and Dommel to create a new inundation between themselves and a Spanish relief army. This event has become one of the most renowned feats of the Eighty Years War,

135 Becquet, "Montaigle," 104, 106. See also Dreiskämper, "Thonis Ongewassen en Johan Copper," 181.

136 Bar-le-Duc, ADM, B 1879, fols. 130v–141r.

137 Barbe, Laverdine and Parizel, *Moulins*, 18; Marchal, *Inventaire*, 328–29; Milot, "Les garnisons," 733; Parmentier, *Pays de Charleroi*, 65; Sartelet, *Sedan*, 77; van de Venne, *Het beleg*, 18.

138 de Stavelot, *Chronique*, 115–16; Molinet, *Chroniques*, 1:376–77.

139 *Ordonnance Corps du Génie (1776)*, 33–35; van den Brand and Manders, *Vesting 't Genneperhuys*, 415; Vandewal, *Moerenpoort*, 14.

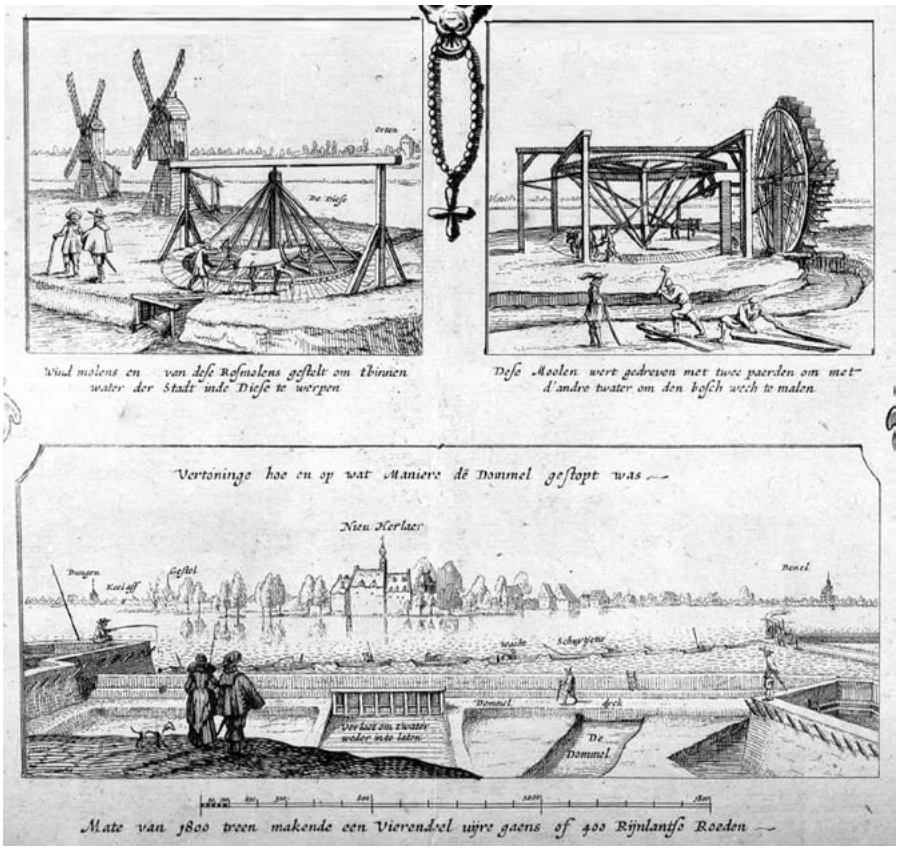

Figure 15. Etching of the Dutch siege of 's-Hertogenbosch in 1629 (detail), by Cornelis Danckerts, 1630 (Amsterdam, Rijksmuseum, RP–P–OB–77.706).

but was actually not that exceptional. Dutch forces already used similar drainage techniques during the 1593 siege of Geertruidenberg.[140] The fame of the 1629 siege is probably based on the numerous prints and paintings made to commemorate it (see figure 15). A noteworthy detail is that the bottom image depicts a soldier fishing. This seems to have been a common practice, even though it could be dangerous. The chronicle of the Sint-Geertuiklooster mentions that a soldier was hit by a cannon ball and lost both his legs whilst fishing in the Dommel.[141]

Such inundations could serve both defensive and offensive purposes. The siege of Aachen in 1248 for example saw the besieging army, joined by pilgrims from the Low Countries, build a huge dam in the river Wurm in order to flood a considerable part

140 De Cauwer, *Tranen van bloed*, 76, 125; De Graaf, *Oorlog*, 237–41, 527–32; van Bavel et al., *De kroniek*, 331–43; Verschure, *Overleven*, 134–36.

141 van Bavel et al., *De kroniek*, 335.

of the city. The expertise for building this huge dam has traditionally been attributed to pilgrims originating from Frisia, but the *Chronicon Regia Coloniensis* indicates that they only arrived after the dam had been built. More landlocked areas might therefore still have had their own experts in hydrology.[142] Chronicles from the Prince-Bishopric of Liège in particular indicate that miners were regularly involved in attempts to divert watercourses during sieges. They undoubtedly used their experience in digging coalmines.[143] As late as 1826–1827 the Netherlands regiment of sappers and miners, which was stationed in Grave and recruited most of its personnel in the Maastricht and Liège area, saved the city from the flooding of the Meuse by reinforcing the river dikes.[144]

The emphasis on establishing a breach or diverting streams was primordial, for sieges were governed by rules designed to limit unnecessary suffering. It is indeed suggestive that few sieges, medieval or early modern, lasted longer than two months after the initial encircling. (The siege of Aachen in 1248, which lasted almost six months is exceptional.) This also meant that starvation rarely became the main motivation for capitulating, although many marginalized groups did suffer from hunger. Disaffected citizens could be an important cause for surrendering early, since holding out until a besieging force fought its way into a fortress or city meant risking pillage, violence, and possibly massacres. The citizens of Saint-Mihiel thus diverted the watercourse that fed the garrison's gunpowder mill in 1635 so that the governor had no choice but to yield to the besieging French army.[145] By the seventeenth century the aim of most sieges was simply to breach the main wall, which was sufficiently large to allow a potential assault to be made. At that point most defenders surrendered.[146]

As a result of such de-escalation measures, sieges were in themselves rarely sufficient to cause the destruction or abandonment of fortifications, despite their similarity to natural disasters. The demolition of major defences, such as the town walls of Dinant in 1466 or those of La Mothe in 1645, was time-consuming and labour-intensive, and therefore a highly symbolic political act that should be clearly distinguished from simple attempts to make a fortification indefensible, typically by creating a breach.[147] Even so, repairing the damage of a siege could still be a long drawn-out process. The *Sentence de Lille*, the peace treaty between Liège and Burgundy from 1408, specified that the citizens of Tongres/Tongeren had to fill the trenches dug during the siege of Maastricht (1407–1408), or pay others to carry out this task. The city council of 's-Hertogenbosch paid a contractor to supply trees in 1632, and again bought one thousand willows, four hundred field elms, and two hundred linden (lime) trees in 1636 to plant on the walls,

142 Rhoen, *Aachen*, 41–46; Waitz, ed., *Chronica*, 293.

143 Gaier, "Aux origines"; Moreau, *Bolwerk der Nederlanden*, 102.

144 van Hoof and Roozenbeek, *Grave*, 50.

145 Abel et Bouteiller, eds., *Journal*, 238.

146 See the collection *How Fighting Ends. A History of Surrender*, ed. Holger Afflerbach and Hew Strachan (Oxford: Oxford University Press, 2012).

147 Brouwers, "La reconstruction"; Genicot, ed., *Les tours*, 41–44; Paviot, "La destruction"; Rorive, *La guerre de siège*, 199–214; Stercken, *Königtum und Territorialgewalten*, 130–35.

which suggests that it took seven years to fully replace the trees cut down during the siege of 1629.[148]

Although most trenches might have been filled again relatively quickly, the disturbances they caused changed the structure of the soil permanently. Archaeological research has benefitted significantly in the last decades from the study of soil and crop marks, particularly differences in soil colour and vegetation growth. These are observable from the air and allow the identification of former fortifications as well as siege trenches. Furthermore, some structures remained a visible part of the local landscape for decades, sometimes even centuries. French engineers who charted the lands between the Sambre and Meuse in 1787, for instance, still depicted old retranchements made in 1689. Four earthen hills constructed within Mézières as artillery platforms (*cavaliers*) during the siege of 1521 also survived into the eighteenth century.[149] Sieges evidently left scars in the landscape, but they were on their own rarely sufficient to cause fortifications' destruction.

Studying the ways armed forces sought to preserve fortifications, or indeed threatened their very existence, is very helpful for understanding these structures' ecological impacts, but it still does not allow a convincing comparison to be made between the historical management of fortifications and the current importance environmentalists attribute to them. It is for this reason that we will now examine an exceptional source, whose value has been mostly ignored up till now: nineteenth-century studies by naturalists of fortifications still actively managed by the military. There are many natural histories or botanical works available for earlier periods, but these rarely provide detailed information where a specific species could be found.[150] This is not to say that the information these sources provide is unproblematic. Many naturalists exclusively focus on vascular plants, which means that animals, mosses, lichens, and fungi are underrepresented. Latin names have also changed markedly in the last hundred and fifty years, and some plants identified by these scholars are no longer recognized as a separate species. It is also unclear to what extent such studies provide evidence about biodiversity in fortifications before the nineteenth century.[151]

Still, there can be no doubt these naturalist studies, when put together, offer us a unique glimpse of the species that lived in fortifications when military organizations were still managing them. It is far from obvious that they would have been permitted

148 Chevalier, "Les 'attres' fortifiés," 41; van Bavel et al., *De kroniek*, 366; van Zuijlen, *Inventaris,* 2:1375, 2:1398–99.

149 Feller, "Toponymie," 100; Lemoine-Isabeau, *La cartographie*, 53–54; Moranvillé, "Un incident," 346; Renard, *Toponymie*, 90–91; Sartelet, *Mézières*, 28; Vanderbeken and Wesemael, "De belegeringen."

150 Weeda, "Over de betrouwbaarheid van oude literatuurgegevens."

151 See however, Dodoens, *Cruijdeboeck*, bk. 4, chap. 47, 555–56. Bellynck, *Flore de Namur*; Biot et al., *Nouveau dictionnaire*, 35; de la Fontaine, *Faune*; Dumoulin, *Guide du botaniste*; Godron, *Flore*, 62, 258–59; Graatsma et al., eds., *De flora*; Lejeune, "Flore des environs de Spa"; Liénard, "Catalogue"; Liénard, "Addendum"; Maujean-Denis, "Flore de la Meuse," 214; Mutel, *Flore française*, 414–15, 418; Pierrot, Cardot, and Vuillaume, *Catalogue*; van Hoven, *Flora van 's-Hertogenbosch*; Vieillot et al., *Faune française*; Wachter, "De mossen."

to do so. Outsiders had limited access to defensive structures, with officers especially concerned about enemy spies. Antoine de Lusy, a citizen of Mons, wrote down in his journal that a man from Brittany was arrested and executed in 1525 for inspecting the moats of the city (a war year). The eighteenth-century regulations of the garrison stationed in the castle of Namur also state that sentries had to arrest anyone found writing or drawing something near the fortifications, and the published results of a botanists' excursion in Givet, dating to 1867, explicitly comment that the naturalists were only able to pass through the fortress of Charlemont after they obtained permission. A captain of the garrison, an amateur botanist himself, served as their guide.[152] It is likewise hardly a coincidence that a military doctor, F. J. J. van Hoven, wrote the oldest guide to the flora of 's-Hertogenbosch or that the pharmacist L. J. G. Dumoulin published his flora of Maastricht in 1868, the same year the fortifications lost their military status (see the appendix for a full overview of species found). Even members of the military had limited or no access to the more restricted parts of the fortifications, which might explain why van Hoven only considers lichens growing on trees and not those on the walls themselves (except one species on the outlying Fort Isabella).[153]

The plant and animal diversity in nineteenth-century fortifications, as revealed by these naturalists' publications, can be explained by drawing attention to the military desire to close off access to these areas, as well as the very landscape diversity these fortifications generated. Military forces' concern with maintaining an open field of fire in combination with their methods of grassland management—mowing the grass only twice a year or pasturing sheep—would in effect have stimulated plant diversity.[154] This diversity in turn could have attracted different kinds of creatures, such as butterflies and moths. The naturalist Félix Liénard explicitly referred to the ditches of the fortifications and fields near the citadel of Verdun as the best locations for catching lepidoptera.[155]

Fortifications were also home to a wide range of water plants, a reflection of the fact that plant growth develops more easily in still or slow-moving water. Dr. van Hoven identified no fewer than three plants that could be found specifically near the inundation slush of Heusden. Mining galleries by contrast have a similar ecological function to caves because of their high humidity and constant temperatures.[156] French naturalists identified the fortress of Charlemont as a hibernation place for rare bats, such as the geoffroy's bat (*Myotis emarginatus*) and the barbastelle (*Barbastella barbastellus*), as early as 1806. Finally, even plants typically associated with woodlands could be found in some fortifications, as Dumoulin disovered a very rare orchid, the violet helleborine

152 The Hague, NA, Raad van State, inv. no. 2078, Orders Castle of Namur, art.2; de Lusy, *Le journal*, 358; Devos, "Compte rendu," 321–22.

153 van Hoven, *Flora van 's-Hertogenbosch*, 31–32.

154 Godron, *Flore*, 62, 258–59; Graatsma et al., eds., *De flora*, 105; van Hoven, *Flora van 's-Hertogenbosch*.

155 Liénard, "Catalogue," 377–78;

156 van Hoven, *Flora van 's-Hertogenbosch*, 5, 8, 9.

(*Epipactis purpurata*) in the coppice wood planted in the outworks beyond the Boschpoort in Maastricht.[157]

The most striking element in fortifications, however, proved to be neither of these environments. Stone walls are home to relatively few species, but the species that they do accommodate can be found nowhere else. Steep stone walls, like those of fortresses, churches, or city walls are, ecologically speaking, quite similar to a rock or mountain environment. A typical example of such a rare species is tower mustard (*Arabis glabra*), a herb that grew on the medieval city walls of Maastricht in 1868. Another typical wall plant, perennial wall-rocket (*diplotaxis tenuifolia*) could be found plentifully on the fortifications of Montmédy, Sedan, Givet, and Rocroy in the nineteenth century. Fortifications were especially important for these plants because only a small part was effectively used on a daily basis for living purposes (simply the towers, gates, and guard houses). If a wall gets heated from the inside the variations in temperature became too extreme for such plants during the colder seasons.[158]

The importance of stone walls lies indeed not only in their specific construction, but also in the creation of warm microclimates. The term microclimate refers to a local variation of the general climate, from a few square metres to several hectares. This variation can be caused by differences in soil structure, as the presence of stone typically generates higher temperatures, but also by vegetation coverage or the presence of water (both of which have a cooling effect), the angle of the incoming sunlight, and the wind. These microclimates are essential for biodiversity, because they can support a far greater range of species than a uniform climate.[159]

One of the most significant environmental impacts of the characteristic star-shaped fortifications of the early modern period might therefore be that they created a mosaic of microclimates, given the variations in sunlight (different angles), humidity (wet or dry moats), and vegetation (trees and hedges). This is confirmed by the study of botanist André Devos from 1870, which records that hyssop grew abundantly in the ditches on the southwestern flank of the fortress of Charlemont and on the south side of the fortress of Montmédy, locations where the sunlight was most intense and winds could only exert limited influence. Many of the lepidoptera found in or near the citadel of Verdun were likewise typical of warmer climates.[160]

Hyssop is not native to the Meuse Region, but had been introduced as a garden plant in the late Middle Ages, being well known for its medical properties. Given that many other plants closely associated with the fortifications can be identified as archaeophytes, it is likely that gardens had a major role in the spread of herbs and flowers to

157 Biot et al., *Nouveau dictionnaire*, 35, 472; Dumoulin, *Guide du botaniste*, 56; Geoffroy-Saint-Hilaire, "Mémoire," 196–97.

158 Dumoulin, *Guide du botaniste*, 19; Francis, "Wall ecology"; Pierrot, Cardot, and Vuillaume, *Catalogue*, 78–79; Segal, *Ecological Notes*, 48–50.

159 Stoutjesdijk and Barkman, *Microclimate*.

160 Devos, "Deux jours d'herborisation," 124–26; Devos, "Les plantes naturalisées," 20, 89; Liénard, "Catalogue," 399, 415, 419, 420, 426, 448, 466, 481; Liénard, "Addendum," 290, 295, 297, 300.

defensive structures.[161] These transfers, deliberate or not, would have been facilitated by the suitability of stone walls for plants of a Mediterranean origin: a rock environment, warm microclimates, and calcareous soils. The fact that limestone constituted one of the most important building materials in the Meuse Region is a crucial element in the fortifications' ecology, because in northern Europe the diversity of calcareous soils is much higher than those of an acidic nature. This is a result of a historical bottleneck: the Ice Ages. During these periods of global cooling the Mediterranean, with its numerous calcerous soils, provided a refuge for species linked to warmer climates, while Europe north of the Pyrenees and Alps experienced a massive extinction. Fortifications might thus have assisted in the gradual recovery of Northern European ecosystems, a process that started after the last Ice Age and continues to this day. Their role might have been especially important in the context of the so-called Little Ice Age (during the sixteenth to nineteenth centuries).[162]

While the connection between gardens and fortifications is quite strong, it is far from certain who managed them. Devos identified gardens in or near the fortresses of Charlemont, Dinant, Namur, and Huy as the origin of some typical garden plants that could be found there in the nineteenth century.[163] This brings us to the nub of the problem: there were many gardens in or near fortifications, but their cultivation was not a military prerogative. One cannot be certain for instance that hyssop or other garden plants that grew in the fortresses of Charlemont and Montmédy had a military origin, for even these fortresses housed small communities that were not part of the garrison as such.[164]

In some cases garden plants established themselves despite intense opposition of the armed forces. Engineers stationed in Maastricht had to devise new inundation basins in 1764, since the old ones, constructed by French forces in the late seventeenth century, had become unsuitable because citizens used them for gardening. They thus made new basins, demolished the gardens in the process, and then used the lands for inspecting the units of the garrison in battle order to ensure no one tried to cultivate these lands again. When Dumoulin gave a lecture about the flora of Maastricht in 1832, however, he still mentioned the presence of wild daffodils (*Narcissus pseudonarcissus subsp pseudonarcissus*) on the dikes of the inundation basins, remnants of the gardens destroyed in 1764.[165]

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161 Devos, "Compte rendu," 303, 306; Devos, "Les plantes naturalisées," 88, 93, 95, 99; Dumoulin, Guide du botaniste, 16, 18, 19, 42, 59, Lejeune, *Flore*, 21, 136; van Hoven, *Flora van 's-Hertogenbosch*, 12; Zeven et al., *De introductie*, 83.

162 Ewald, "The Calcareous Riddle"; Segal, *Ecological Notes*, 58–67.

163 Devos, "Deux jours d'herborisation," 124–26.

164 Bellynck, *Flore de Namur*, 10, 12, 21, 22, 24, 27, 32, 50, 59, 70, 76, 79, 120, 124, 136, 163, 167, 208, 263, 279, 285, 296, 312–316, 318–19; Bragard, *Le château*, 43, 57, 101; Caminada-Voorham, *Loevestein*, 95–96; Douxchamps-Lefèvre, *Inventaire*, 5:241; Leestmans, *Soldats*, 198; Richer, *Abrégé chronologique*, 135.

165 The Hague, NA, Raad van State, inv. no. 2057: Garnisoensorderboek, October 5, 1785; Graatsma et al., eds., *De flora*, 37, 47, 85; Moreau, *Bolwerk der Nederlanden*, 258–62.

Figure 16. The Hoge Fronten in Maastricht, now a nature reserve (photograph by the author).

These daffodils were far from the only species that survived in fortifications despite attempts to remove them. One of the officers of the Maastricht garrison filed a request with the forestry department in the 1820s to put fox traps in the mining galleries. He claimed that the animals could damage these underground corridors with their burrowing. This might have been a common attitude, for Eduard Lenz, a sapper lieutenant in the Bavarian army, also recommended the eradication of hole-digging animals in his treatise *Ueber technische Truppen* (1827).[166] Contractors tasked with executing basic maintenance tasks similarly had to cut down caterpillar nests and remove nettles or thistles. Bats seem to have survived relatively unscathed, being considered just a minor nuisance. Lenz simply specified that droppings of bats and other creatures had to be cleared from the mining galleries.[167]

The biological diversity these naturalists encountered was therefore to a large extent unintended. It does not follow, however, that the role of the military in bringing about these ecological results was negligible. Military forces created and maintained landscape diversity because it had military value, and this variety in turn made a remarkable

166 Pelzers, de Rijk, and Thissen, "Zoogdieren," 168; Lenz, *Ueber technische Truppen*, 33–34.

167 Liège, AEL, Etats, inv. no. 3007; Maastricht, RHCL, 07.E01, inv. no. 9: Performance specifications concerning the maintenance of the fortifications of Maastricht, September 6, 1825; Caminada-Voorham, *Loevestein*, 52; Hasselbrink, *Manuductio ad Architecturam Militarem*, 177.

diversity of species possible. This can best be illustrated by taking the fortifications of Nijmegen as an example. This city was the subject of two different botanical studies, one from 1848, the other in 1888, which allow a systematic comparison to be made between plant diversity before and after the city's defences lost their military value (1874). While some typical wall vegetation survived in those parts of the walls that had not yet been broken down, in most cases ruderal plants ("weeds") had replaced them.[168]

The parts of the fortifications that survived onslaughts of urban development typically became incorporated into parks. Others joined older defence structures that had become isolated ruins in the middle of woodlands. Such abandoned fortifications still have ecological value, but their importance mainly lies in the fact that they are green islands in the middle of landscapes that were transformed as a result of industrialization, population growth, and an intensification of agriculture.[169] Instead of allowing trees and shrubs to take over former fortifications, which eventually contributes to their destruction, many conservationists now opt for maintenance that strongly resembles historical management practices. Sheep graze in the largest surviving part of the early modern fortifications of Maastricht, the Hoge Fronten, and most woody plants have been removed (see figure 16).

Nevertheless, even ruins of medieval fortresses, abandoned for several centuries, could still play an important ecological role. A recent study of former castle mottes in French woodland environments has demonstrated that they exhibit significant differences in the composition of plant species, compared to the woodlands that surround them. These ruins act as ecological islands that are valuable from a biological viewpoint because they add diversity to the landscape. They contain more species typical of calcareous and nutrient rich soils, as well as more competive ruderal species and epizoochores. A similiar study regarding molluscs in the Czech Republic has confirmed these results. Even though these medieval fortifications had been abandoned for centuries the chemical changes in the soil structure they brought about retain their influence till this very day.[170]

Conclusion

The current variety of plants and animals in disused fortifications is a logical consequence of these structures' ecology when they still had military value. Neglect is not a prerequisite for fortifications to be biologically significant. Up to a certain point it is even counterproductive, for the landscape diversity typical for fortifications depends on human involvement and regular maintenance. Plants, earth, and natural stone remained the main components of fortifications until concrete and barbed wire replaced them in the later nineteenth century. In the case of the Meuse Region continuity was so strong

168 Dirkse, Hochstenbach, and Reijerse, *Flora*, 191, 283, 289, 336.

169 Cremers, Kaaij, and Steenbergen, *Bolwerken*, 125–29; Lawrence, *City Trees*, 195–98; van der Woud, *Het lege land*, 324–40.

170 Closset-Kopp and Decocq, "Remnant Artificial Habitats"; Jurickova and Kucera, "Ruins of Medieval Castles."

that many stone fortifications built during the Central Middle Ages retained their defensive role into the nineteenth century. Their presence defined militarized landscapes across the centuries.

The biodiversity value of fortifications, as reflected in the studies of nineteenth-century naturalists, was directly related to the defensive value of preserving various landscape elements in a relatively compressed space. At the same time numerous species spread to fortifications unintentionally, or even despite military opposition. This chapter consequently does not claim that armies deliberately made fortifications a suitable place for numerous species of plants and animals, only that the need for military defence created circumstances that allowed flora and fauna to thrive. Many conservationists actually manage former fortifications in a manner that strongly resembles premodern practices. A ruin in the middle of woodlands, on the other hand, can also have ecological value. Everything depends on local circumstances and establishing priorities. Leaving a former fortress covered with woody plants alone might be preferable if forest ecosystems are very rare in that specific area. One just has to keep in mind that in such instances abandoned fortifications become valuable because humans have overexploited ecosystems to such an extent that every green island in a sea of grey becomes significant. This is quite distinct from the historical contribution of fortifications to landscape diversity.