



András Vadas

# The Environmental Legacy of War on the Hungarian-Ottoman Frontier, c. 1540-1690

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Hungarian-Ottoman Frontier, c. 1540–1690



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*In memory of Papa*



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## Note on Names

If a settlement lies outside the territory of present-day Hungary, I always use its official current place name. To make identification easier in the index, I will also refer to the Hungarian or other relevant forms of the settlement name. If a settlement is lost or integrated into a modern settlement with a different name, I will use its medieval or early modern name. For rivers having sections in present-day Hungary, I will use the Hungarian names unless they have an English version. For rivers outside of present-day Hungary, I will use the form of the name used in the relevant countries. For the historical names of counties, I will use their Hungarian forms. I will use the English forms of the names of kings and queens but will always indicate their title in Hungary.



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Nagykovácsi, August 2022



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# 1 Introduction

## Abstract

The chapter sketches the main questions of the book and provides its main chronological and geographic frameworks. It focuses on the problem of the interrelation between wars and the environment and addresses the question of the environmental transformation caused by the lasting military conflict between the Kingdom of Hungary ruled by the Habsburgs and the Ottoman Empire in the sixteenth and seventeenth centuries.

**Keywords:** Environmental history, Kingdom of Hungary, Ottoman Empire, Carpathian Basin, military history

The concept behind this book stems from an article I wrote more than ten years ago. I became interested in the environmental history of the Middle Ages and the early modern period and decided to write a piece on the “great famine” of the 1310s in the Carpathian Basin.<sup>1</sup> While browsing through the sources from that period, I encountered some references to the impact of military campaigns on local economies and landscapes. The problems that military campaigns caused are, of course, neither specific to the 1310s nor the Carpathian Basin, and the environmental effects of periods of war have been studied in various contexts. Oddly enough, one of the best studies written thus far on environmental disturbances of medieval warfare looks at the same period, the early fourteenth century, but does not focus on Central Europe but instead on the British Isles and looks at the intertwined history of the Scottish wars, the Great Famine, and the cattle plague that devastated the island.<sup>2</sup> However, ten years ago when I was working on the

1 András Vadas “Documentary Evidence on the Weather Conditions and a Possible Crisis in 1315–1317: Case Study from the Carpathian Basin,” *Journal of Environmental Geography* 2, no. 3–4 (2009): 23–29.

2 Philip Slavin, “Warfare and Ecological Destruction in Early Fourteenth-Century British Isles,” *Environmental History* 19 (2014): 528–550, idem, “Ecology, Warfare and Famine in Early Fourteenth-Century British Isles: A Small Prolegomenon to a Big Topic,” in *Guerra y carestía en*



fourteenth-century crisis and their military aspects in the Kingdom of Hungary, significantly less literature was available on pre-modern wars and the environment than nowadays. Nevertheless, I tried to access basic literature on the environmental impacts of wars in general. One of the first seemingly relevant articles I found was Joseph Hupy's essay, "The Environmental Footprint of War".<sup>3</sup> Though Hupy's overview referred to pre-modern wars and their environmental implications, it mostly focused on the possible environmental impacts of warfare after the introduction of the systematic use of smokeless gunpowder and, most importantly, the chemical weapons used in the twentieth century. He identified three types of war-related environmental disturbances:

- (1) Environmental disturbance and destruction from weaponry;
- (2) Direct consumption of resources: timber, water, and food to support armies;
- (3) Indirect consumption by military complexes.<sup>4</sup>

He provides the reader with examples of the long-term impacts of the First World War and the Vietnam War. With some of the pre-modern cases that he mentions, he emphasizes the pre-modern warfare use of scorched-earth tactics – in England mostly referred to as 'chevauchee' – which caused abrupt local environmental and landscape transformations. However, he failed to provide examples for the applicability of the above three categories to pre-modern wars in general. Because of the seemingly limited applicability of his theory for my case study at that time, I did not use the article very much when studying the fourteenth-century environmental disturbances and their connections to wars. However, when I engaged in analyzing sixteenth- and seventeenth-century wars in the Carpathian Basin, the three types of environmental disturbances caused by wars that Hupy identified started to seem applicable in a pre-modern context as well.

Hupy applies his theory to modern wars, which due to the nature of modern weaponry tend to be shorter than those fought in pre-modern times. This of course means that modern studies mostly focus on the immediate impacts caused by the armies marching through, or the direct destruction

*la Edad Media*, ed. Pere Benito i Monclús (Lleida: Milenio, 2015), 85–99, and Philip Slavin, *Experiencing Famine: A Fourteenth-Century Environmental Shock in the British Isles* (Environmental Histories of the North Atlantic World [EHNAW], 4) (Turnhout: Brepols, 2019).

3 Joseph P. Hupy, "The Environmental Footprint of War," *Environment and History* 14 (2008): 405–421.

4 Hupy, "The Environmental Footprint," 406.



such as burning plowlands and pastures, deliberate destruction of infrastructures, or the cutting of supply chains. Slavin's article as well as further case studies point out that the above three elements were also present in pre-modern warfare, however, there are other kinds of disturbances that can also be associated with these conflicts. My goal in this book is to explore a different kind of war than those discussed by such scholars as Hupy or Slavin, one that lasted almost two centuries.

Probably the single most significant political change in the history of Hungary until the twentieth century – or even including what followed the First World War<sup>5</sup> – that triggered transformations in land use and the settlement network occurred in the sixteenth and seventeenth centuries, when the political unity of the medieval Kingdom of Hungary, forming most of the Carpathian Basin, came to an end for a long period and the Ottoman Empire gradually took control over the center of the basin area. In schoolbooks as well as different textbooks, the Ottoman war period is considered the biggest cataclysm in the history of Hungary along with the Mongol invasion of 1241–1242. To some extent, both are remembered in the same terms, with the warring parties plundering much of the Kingdom of Hungary and leaving empty lands behind.<sup>6</sup> However, because of the long-lasting presence – lasting well more than 150 years – of the Ottomans in or in the immediate surroundings of the Carpathian Basin, it has frequently been argued that they had a long-term impact on the environment. This book aims to provide a deeper understanding of the environmental legacy of the Ottomans' presence in the central parts of the basin area, with special regard to the impacts of the recurrent military conflicts during this time.

The main questions I am addressing in this book are, first, how the Ottoman-Hungarian wars affected the landscapes of the frontier zone in the Carpathian Basin, and second, how the environment was used in the military tactics of the opposing realms. The book intends to explore the dynamic interplay between war, environment, and local society in the early modern period. By doing so, I hope to demonstrate that it is just as valid to look at how pre-modern wars impacted the environments as it is to examine the environmental effects of the American Civil War, the two world wars, and the Korean or Vietnam Wars.

5 Géza Pálffy, "Mohács radikálisabb változásokat hozott, mint Trianon" [Mohács brought more radical change than did Trianon]. Online document: Transindex, 2015. <http://vilag.transindex.ro/?cikk=25515> (last accessed: 29 June 2020).

6 For more information on the Mongol invasion, see *Tatárjárás* [Mongol invasion] (Nemzet és emlékezet), ed. Balázs Nagy (Budapest: Osiris, 2003).



In recent years, a good number of studies and edited volumes have addressed the problems of war environments, mostly showing interest in the impacts of military campaigns and to some extent the environmental consequences of a frontier area. Although the number of works in the field is rapidly rising, there are only about a few dozen works that directly focus on the environmental consequences of warfare and even fewer that touch upon non-modern warfare and its impacts. This may indirectly lead to the assumption that the environmental effects of war can be best understood through modern warfare.<sup>7</sup> The case studies mostly discuss the environmental impacts of warfare from the American Civil War onwards, through the two world wars, to the Vietnam and the Gulf Wars.<sup>8</sup> Despite the clearly different environmental impacts of the Battle of Gettysburg and the napalm attack in the Vietnam War, most studies – except for the long-term perspectives applied when looking at the wars on the Korean Peninsula<sup>9</sup> – share a common feature: they all discuss relatively short war periods and mostly focus on battlefields and not extensive areas such as hinterlands and the impact of war on these environments.<sup>10</sup> Using a common framework, most studies examine the impacts of modern weaponry on the environment. As environmental history in general grew rapidly in the United States, followed by a time gap by European environmental history, it is rather self-evident why most studies address modern-age problems.

It is, perhaps, not an overstatement to assume that the most popular topic in non-contemporary American history is the Civil War (1861–1865); as such, it is no surprise that the study of the environmental impacts of

7 For the most recent overview of the field, see Lisa M. Brady, “War from the Ground Up: Integrating Military and Environmental Histories,” in *A Field on Fire: The Future of Environmental History*, eds. Mark D. Hersey and Ted Steinberg (Tuscaloosa, AL: The University of Alabama Press, 2019), 250–262.

8 For a comprehensive bibliography of the topic, see <http://environmentandwar.com/bibliographies/> (last accessed: 17 April 2021) at the Environment and War website edited by Richard Tucker.

9 E.g., Mark Fiege, “Gettysburg and the Organic Nature of the American Civil War,” in *Natural Enemy, Natural Ally: Toward an Environmental History of War*, eds. Richard P. Tucker and Edmund P. Russell (Corvallis, OR: Oregon State University Press, 2004), 93–109, and Arthur H. Westing, “The Environmental Aftermath of Warfare in Viet Nam,” *Natural Resources Journal* 23 (1983): 365–389; for Korea, see Lisa M. Brady, “Life in the DMZ: Turning a Diplomatic Failure into an Environmental Success,” *Diplomatic History* 32 (2008): 585–611, and the special issue of the *Journal of Asian Studies* 77, no. 2 (2018): War and Environment in Korean History.

10 The notable exceptions include the works of Brady as well as the studies to be quoted in this and the following footnotes. *Environmental Histories of the First World War*, eds. Richard Tucker et al. (Cambridge: Cambridge University Press, 2018).



warfare mostly focused on Civil War battlefields,<sup>11</sup> where the first steps to a more complex understanding of warfare environments unfolded. Lisa M. Brady's *War Upon the Land* is pioneering in its consideration of long-term landscape change brought about by three Southern campaigns of the Union army.<sup>12</sup> Brady's work is thus far one of the very few monographs to touch upon the environmental history of war not only by examining the history of the devastation of the land but also by looking primarily at the role of nature in military tactics and the role that understanding environmental conditions played in the Union winning the war. 'How did pollution affect landscapes, for instance, turning fertile lands into wastelands? How did depopulation allow reforestation in different areas affected by war or military operations? How do war landscapes become sites of memory?' These questions, including some concerning fundamentally different processes, have only been addressed by a handful of studies so far.<sup>13</sup>

The environmental legacy of warfare in the last three decades, much influenced by the Gulf War experiences, has become an important topic in the environmental history of the modern period. The long-term legacy of warfare and nuclear explosions has provided scholars with excellent laboratories for human–nature interactions. The examples described in different volumes thus far have concerned the nineteenth to the twenty-first centuries. Is there a way to understand pre-modern war environments and their environmental legacies?

In an introductory essay to *Natural Enemy, Natural Ally*, Richard Tucker gave one of the best overviews of the existing research directions in the environmental history of wars.<sup>14</sup> His essay not only touches upon modern

11 *The Blue, the Gray, and the Green. Toward an Environmental History of the Civil War*, ed. Brian Allen Drake (Athens, GA: The University of Georgia Press, 2015).

12 Lisa M. Brady, *War upon the Land: Military Strategy and the Transformation of Southern Landscapes during the American Civil War*, foreword by Paul S. Sutter (Environmental History and the American South) (Athens, GA: University of Georgia Press, 2012).

13 See Lisa M. Brady, "Life in the DMZ: Turning a Diplomatic Failure into an Environmental Success," *Diplomatic History* 32 (2008): 585–611. See also many of the studies in: *Militarized Landscapes: From Gettysburg to Salisbury Plain*, eds. Chris Pearson, Peter A. Coates, and Tim Cole (London: Continuum, 2010), especially those in Part III. Like parts of the areas affected by the Civil War that became national parks or memorial parks, the region of Chernobyl after the 1986 nuclear accident soon became one of the richest areas in wildlife in East-Central Europe. Cf. T.G. Deryabina et al., "Long-Term Census Data Reveal Abundant Wildlife Populations at Chernobyl," *Current Biology* 25, no. 19 (2015): R824–R826. On this issue, see recently: Kate Brown, *Manual for Survival: A Chernobyl Guide to the Future* (New York: W.W. Norton, 2020).

14 See also most recently, with many of the points recapitulated: Richard P. Tucker, "War and the Environment," in *A Companion to Global Environmental History*, eds. John R. McNeill and Erin Stewart Mauldin (Chichester: Wiley Blackwell, 2012), 319–339.



warfare but also considers the problems of pre-modern war environments. As he puts it:

Throughout the pre-modern world, many conflicts took the form of frontier wars fought between non-state societies, two states, or as wars of conquest pursued by an ambitious power on its periphery. Often protracted and intermittent, these wars were similar in many ways to modern guerilla warfare and counter-insurgency, though they did not produce the devastation that is caused by today's counter-insurgency weapons.<sup>15</sup>

Tucker saw the environmental impact of long-lasting wars at frontiers as one of the issues worth considering. These wars, lasting in many cases for decades, were fundamentally different in nature from modern warfare. The war that took place in the Carpathian Basin, which is discussed in the coming chapters, was certainly one of the long-lasting ones. As I will argue, the constant presence of military troops and a military population in the frontier zone had a lasting impact on local environments. This resonates well with Tucker's quote above regarding the character of long-lasting frontier wars, but I will argue in the following chapters that these wars nonetheless equally have the potential of causing major transformations in land use and as a consequence of transforming the ecological conditions of major areas.

The few studies that have addressed the problem of pre-modern war environments discuss the following three topics: first, the impact of scorched-earth (or *chevauchée*) tactics on the environment, second, deforestation and wars, and last, the environments of buffer or frontier zones between powers.<sup>16</sup> The environmental impact of scorched-earth tactics has been studied in different contexts from ancient times onwards, but there is a gap in the comprehensive scholarship of its application in early modern warfare.<sup>17</sup>

15 Richard P. Tucker, "The Impact of Warfare on the Natural World: A Historical Survey," in *Natural Enemy, Natural Ally*, 24.

16 I will not go into the discussion of the impact of climate and weather or the impact of different diseases on warfare in the pre-modern period, as they fell out of the scope of the present book. Cf. Dagomar Degroot, "The Frigid Golden Age: Experiencing Climate Change in the Dutch Republic, 1560–1720," (PhD diss., York University, 2014), idem, *The Frigid Golden Age: Climate Change, the Little Ice Age, and the Dutch Republic, 1560–1720* (Cambridge: Cambridge University Press, 2018) and John R. McNeill, *Mosquito Empires: Ecology and War in the Greater Caribbean, 1620–1914* (New York: Cambridge University Press, 2012), all with overviews of existing literature on these topics.

17 See John McNeill, "Woods and Warfare in World History," *Environmental History* 9 (2004): 401, and Tucker, "War and the Environment," 321. See also: Jan Phillip Bothe, "How to 'Ravage' a



This tactic, as is demonstrated in Hungarian research, was seldom used in the Ottoman war period. Many of the sources from the period, however, show that it was very much present in the potential military arsenal of the military leadership, which consisted mostly of non-Hungarian aristocrats.<sup>18</sup>

The second problem mentioned above, the use of forest resources in war periods, is much more important in the context of the present book. Wars consume forest resources in many different ways. One of them was the use of timber and wood to build different war machines. From ancient times, chariots were used extensively in warfare. This may have had an impact on forest resources in Assyria and parts of the Peloponnesus or Egypt<sup>19</sup> but certainly did not affect the whole of the Mediterranean Basin. The use of timber in shipbuilding may have had larger-scale impacts on the forest resources in the same area. The Ottomans in the period of their early expansion were not among the maritime powers, but from the sixteenth century onwards they built up one of the largest navies of the Mediterranean and had ambitious plans to create a major military transportation network using the rivers in East-Central Europe.<sup>20</sup>

Ottomans as well as Hungarians used the dense river network of the frontier area both to protect the frontiers and for supply and logistics.<sup>21</sup> The number of supplies used by the fleets in the Carpathian Basin was negligible

Country. Destruction, Conservation and Assessment of Natural Environments in Early Modern Military Thought," *Hungarian Historical Review* 7 (2018): 510–540.

18 Géza Pálffy, "Scorched-Earth Tactics in Ottoman Hungary: On a Controversy in Military Theory and Practice on the Habsburg-Ottoman Frontier," *Acta Orientalia Academiae Scientiarum Hungaricae* 61 (2008): 181–200.

19 On the lack of forest resources in Ottoman Egypt, see: Alan Mikhail, *Nature and Empire in Ottoman Egypt: An Environmental History* (Cambridge: Cambridge University Press, 2011), 124–169.

20 See the fundamental work of Colin Imber, "The Navy of Süleyman the Magnificent," *Archivum Ottomanicum* 6 (1980): 211–282. See more recently the studies of the volume: *The Ottomans and the Sea* (Oriente Moderno, XX/1), ed. Kate Fleet (Rome: Skilliter Centre for Ottoman Studies, 2001) and Giancarlo Casale, *The Ottoman Age of Exploration* (New York: Oxford University Press, 2010).

21 On the Hungarian fleet at Lake Balaton, see Ferenc Végh, "A balatoni 'hadiflotta' a török korban" [The 'Navy' on Lake Balaton in the Ottoman Period], *Hadttörténelmi Közlemények* 129 (2016): 27–56. Comprehensive studies of both the Hungarian and Ottoman fleet in the Carpathian Basin are yet to be done. See nonetheless on the Ottoman fleet: Klára Hegyi, *A török hódoltság várjai és várkatonasága*, 3 vols. [Castles and garrisons of Ottoman Hungary] (História Könyvtár. Kronológiák, Adattárak, 9) (Budapest: História and MTA Történettudományi Intézet, 2007), vol. I, 101–104. See also for another frontier region of the Ottoman Empire from an environmental history perspective: Faisal H. Husain, "Changes in the Euphrates River: Ecology and Politics in a Rural Ottoman Periphery, 1687–1702," *Journal of Interdisciplinary History* 47 (2016): 1–25, idem, *Rivers of the Sultan: The Tigris and Euphrates in the Ottoman Empire* (New York: Oxford University Press, 2021), as well as Gül Şen, *Jordan as an Ottoman Frontier Zone in the Sixteenth–Eighteenth Centuries* (Ulrich Haarmann Memorial Lecture, 15) (Berlin: EB-Verlag Dr. Brandt, 2018).



compared to the timber consumption of the major military complexes, most of all the Arsenale at Venice, which required systematic accounting and protection of forest resources in a major area north of Venice, the so-called Terraferma.<sup>22</sup> To keep track of available forest resources, from the sixteenth century onwards the Venetian administration regularly ordered a count of the oaks in the Terraferma area. Of course, the problem is not limited to the Mediterranean: shipbuilding was of crucial importance to countries ranging from France through the British Empire to Korea in the early modern period.<sup>23</sup>

Scholarship both in Hungary and elsewhere dealing with the same period has found some other forms of wood consumption such as firewood needs for gunpowder production and gun founding, the need for timber for earth and wood fortifications, siege machinery, road construction for military campaigns, etc. Most of these will be discussed below, and earth and wood fortifications seem to bring the most controversial results in the scholarly literature. The varied forms of war-related wood consumption and the difficulties of understanding their importance may explain why relatively few studies have addressed forest resources in the context of pre-modern war environments so far.<sup>24</sup> Finally, some studies have raised the problem of using the environment in frontier protection and organization. Different landscapes and contexts have been studied, such as Qing China, the Southern Russian borderlands, or the Flemish coastal area in the late medieval period and the early modern times.<sup>25</sup> Nonetheless, there is a lack of comparative

22 Karl Appuhn, *A Forest on the Sea: Environmental Expertise in Renaissance Venice* (Baltimore: Johns Hopkins University Press, 2009).

23 See Paul Bamford, *Forests and French Sea Power, 1660–1789* (Toronto: Toronto University Press, 1956), Robert G. Albion, *Forests and Sea Power: The Timber Problem of the Royal Navy, 1652–1862* (Cambridge, MA: Harvard University Press, 1936), and John S. Lee, “Postwar Pines: The Military and the Expansion of State Forests in Post-Imjin Korea, 1598–1684,” *The Journal of Asian Studies* 77 (2018): 319–332.

24 For a highly comprehensive overview, see McNeill, “Wood and Warfare.” See furthermore: Greg Bankoff, “Wood for War: The Legacy of Human Conflict on the Forests of the Philippines, 1600–1946,” in *War and the Environment: Military Destruction in the Modern Age*, ed. Charles Closmann (College Station, TX: Texas A&M University Press, 2009), 32–48.

25 David A. Bello, *Across Forest, Steppe, and Mountain: Environment, Identity, and Empire in Qing China's Borderlands* (Cambridge: Cambridge University Press, 2016). See also: Alfred J. Rieber, *The Struggle for the Eurasian Borderlands: From the Rise of Early Modern Empires to the End of the First World* (New York: Cambridge University Press, 2014), Geoffrey Parker, *Global Crisis: War, Climate Change and Catastrophe in the Seventeenth Century* (New Haven, CT: Yale University Press, 2013), 523–526, John F. Richards, *The Unending Frontier: An Environmental History of the Early Modern World* (Berkeley, CA: University of California Press, 2005), esp. 242–272. See: also: Adriaan M. J. Kraker, “Flood Events in the Southwestern Netherlands and Coastal Belgium, 1400–1953,”

studies in this field, and neither the Habsburg nor the Ottoman Empire's borderlands have been studied from this perspective.<sup>26</sup>

The above overview of environmental histories of pre-modern warfare is anything but exhaustive, mainly because the number of works dedicated to the problem is surprisingly low. The problem has been identified by several scholars in recent decades for different environments, but the fundamental question – that is, what kind of impact a long-lasting medieval or early modern war period may have had on local environments – has only partially been addressed. Also, too few studies have approached the problem from a bottom-up perspective, that is, how local societies were affected by the frontier organization. Because of the nature of the sources used, almost all the above studies have looked at the policies of forming the frontier. This book examines the phenomenon from a different point of view.

## 1.1 Frontier, Border – Do They Mean Anything?

Today, when thinking of borders, most people probably imagine lines that divide the different polities on maps. Some might even think of the different colors used by mapmakers to indicate the states on political maps. Pre-modern maps were certainly dissimilar, and very few borders were defined by lines.<sup>27</sup> Some basic questions must therefore first be clarified. What makes the study area described above a frontier zone? Was there a well-defined border between the Kingdom of Hungary and the Ottoman Empire in the sixteenth or seventeenth centuries? Were there borders

*Hydrological Sciences–Journal des Sciences Hydrologiques* 51 (2006): 913–929 and idem, “War, Climatic Stress and Environmental Degradation during the Fifteenth and Sixteenth Centuries. The Case of the North Flemish Coastal Landscape in the Estuary of the Western Scheldt,” in *The Dance of Death in Late Medieval and Renaissance Europe: Environmental Stress, Mortality and Social Response*, eds. Andrea Kiss and Kathleen Pribyl (New York: Routledge, 2019), 66–85.  
26 For partial treatment of the problem in these contexts, see Husain, “Changes in the Euphrates River,” and idem, *Rivers of the Sultan*.

27 For a recent treatment of the formation of linear frontiers in the Early Middle Ages, see: Florin Curta, “Linear Frontiers in the 9<sup>th</sup> Century: Bulgaria and Wessex,” *Quaestiones Medii Aevi Novae* 16 (2011): 15–32. See also Hans-Jürgen Karp's fundamental work on the topic: *Grenzen in Ostmitteleuropa während des Mittelalters. Ein Beitrag zur Entstehungsgeschichte der Grenzlinie aus dem Grenzsaum* (Forschungen und Quellen zur Kirchen- und Kulturgeschichte Ostdeutschlands, 9) (Cologne and Vienna: Böhlau, 1972). On the problem of borders and frontiers in early modern studies, see the introduction to *Grenzen und Grenzüberschreitungen. Bilanz und Perspektiven der Frühneuzeitforschung* (Frühneuzeit-Impulse, 1), eds. Christine Roll, Frank Pohle, and Matthias Myrczek (Vienna, Cologne, and Weimar: Böhlau, 2010) by Christine Roll, “Grenzen und Grenzüberschreitungen in der Frühen Neuzeit – eine Einführung in die Forschung,” 13–22.





between polities at all in this period that the different actors were aware of and which necessitated different practices on either side? Before sketching out the chief theme of the book and the question it aims to raise and answer, these basic problems must be discussed, as the following chapters focus on the concept of frontiers.

The terms frontier and border are often used in everyday speech, but as is usual with general terms like these, it is rather difficult to define what they actually mean. Anglo-Saxon historiography has long been obsessed with the problem of frontiers. Following in the footsteps of the highly influential thesis of Frederick Jackson Turner on the role of the frontier in the formation of the American democracy published in 1893, frontier history and frontier studies became core teaching areas in U.S. colleges and universities.<sup>28</sup> Turner's thesis was a milestone in the discussion of frontiers in the social sciences. Historians of medieval and early modern Europe as well as Ottomanists have also been intrigued by the problem of frontiers. While a frontier in Europe had stood between two polities by the late medieval period, the case was different in the eighteenth and nineteenth centuries in the United States, an area of constant expansion and a zone of passage.<sup>29</sup> Although frontiers as understood by Turner had little to do with frontiers in Europe in the pre-modern period, attempts have been made to apply Turner's thesis to the German *Ostsiedlung*.<sup>30</sup> In French and German historiography, for a long time the most influential concepts – apart from Turner's thesis – were rooted in the geographical thinkers of the nineteenth century. Building on many of the ideas of Friedrich Ratzel, the famous historian of the *Annales*, Lucien Febvre made important contributions to the understanding of what frontier and border meant in pre-modern Europe. He points out that historians and geographers like to think of frontiers as borderlines despite the limited applicability of this concept before the origin of modern states

28 Frederick Jackson Turner, "The Significance of the Frontier in American History," in *Proceedings of the State Historical Society of Wisconsin at its Forty-First Annual Meeting, Held December 14, 1893* (Madison, WI: Democrat Print Co., 1894), 79–112. Frederick Jackson Turner, *The Frontier in American History* (New York: Henry Holt and Co., 1920), Ch. 1.

29 Daniel Power, "Introduction," in *Frontiers in Question: Eurasian Borderlands, 700–1700*, eds. Daniel Power and Naomi Standen (Basingstoke: Macmillan, 1999), 2.

30 James Westfall Thompson, "Profitable Fields of Investigation in Medieval History," *American Historical Review* 18 (1913): 490–504. A classic example of the application of this thesis to the European Middle Ages is the study of A. R. Lewis, "The Closing of the Medieval Frontier 1250–1350," *Speculum* 33 (1958): 475–485. Cf. Florin Curta, "Introduction," in *Borders, Barriers, and Ethnogenesis: Frontiers in Late Antiquity and the Middle Ages*, ed. idem (Turnhout: Brepols, 2005), 4, and Andrzej Janeczek, "Frontiers and Borderlands in Medieval Europe. Introductory Remarks," *Quaestiones Mediaevi Novae* 16 (2011): 8.



and administrations in the latter part of the early modern period. He also highlights that the meaning of the French *frontière* has varied from the Middle Ages onwards even within the French context, and the words of the same root – the English *frontier* or the Spanish *frontera* – also have quite different meanings.<sup>31</sup> Studies on frontier histories in the second half of the twentieth century created an abundance of definitions and diversified the understanding of both frontier and border, as a result of which they were used in a wide range of specific contexts. In many cases, the same volumes have published studies on physical frontiers, frontier societies, and frontiers of a certain phenomenon such as a religion or a custom. Apart from an attractive title in most cases, the studies had little to do with each other. Applying different ideas of frontiers and borders, the introductory essays to these volumes try to give some theoretical overview of the concepts and thus provide the most important basis for interpreting frontiers and borders.<sup>32</sup>

The area the present book focuses on can be understood as a frontier from several seemingly different angles. To note but a few, with the advance of the Ottomans, the area of the Kingdom of Hungary came to border on a new empire not only in a political sense but also in a religious one, an idea often thematized in medieval and early modern literary works.<sup>33</sup> This book also interprets the frontier in a very down-to-earth way. The word ‘frontier’ reflects the military-political position of an area and its impact on the local economies and environments. There are at least two fundamental aspects that characterized frontiers before modern times.<sup>34</sup> First, contemporary actors perceived the area as a frontier. As will be discussed in Chapter 2, this is certainly true for the area in question; not only did the local societies think of the area as a frontier zone but so did the Habsburg administration at Vienna and the Sublime Porte at Istanbul.<sup>35</sup> Second, apart from the sometimes fixed

31 Lucien Febvre, “Frontière,” *Bulletin du Centre international de synthèse. Section de synthèse historique* no. 5 (1928): 31–44. See also: idem, *A Geographical Introduction to History* (London and New York: Kegan Paul, Trench, Trubner and Co. and Alfred A. Knopf, 1932), 296–306.

32 E.g., *Medieval Frontiers: Concepts and Practices*, eds. David Abulafia and Nora Berend (Burlington, VT: Routledge, 2002), *Frontiers in Question, Borders, Barriers, and Ethnogenesis, Frontier and Border Regions in Early Modern Europe*, eds. Raingard Esser and Steven G. Ellis (Hannover: Wehrhahn Verlag, 2013), *Menschen und Grenzen in der Frühen Neuzeit*, eds. Wolfgang Schmale and Reinhard Stauber (Innovationen. Bibliothek zur Neueren und Neuesten Geschichte, 2) (Berlin: Verlag Spitz, 2000) and other volumes quoted above.

33 Paul Srodecki, *Antemurale Christianitatis: Zur Genese der Bollwerksrhetorik im östlichen Mitteleuropa an der Schwelle vom Mittelalter zur Frühen Neuzeit* (Husum: Matthiesen Verlag, 2015) has an exhaustive bibliography on the topic.

34 E.g., Nora Berend, “Preface,” in *Medieval Frontiers*.

35 See section 2.1.



borders from the medieval period onwards, as is indicated by several case studies, there is an easily definable feature of frontier zones: their militarized nature. Such zones are surrounded by numerous fortifications which are designed to protect the hinterland and control the opposing power. Different forms of frontiers have been identified in recent scholarship; the case of the area discussed here provides an example par excellence of an unstable frontier region with extensive defensive features.<sup>36</sup>

I argue in the chapters to follow that most of the central part of the Carpathian Basin – called Transdanubia (*Dunántúl*) and the Great Hungarian Plain (*Alföld*) – should be categorized as a frontier or contact zone where the military and economic practices differed significantly from those in the core areas of the surrounding polities – the Kingdom of Hungary, the Ottoman Empire, and slightly to the east, the satellite state of the latter, the Principality of Transylvania. As mentioned, scholarship has shown increasing interest in cultural and religious frontiers in recent decades, but the topic of political frontiers in pre-modern frontier studies has elicited limited attention.<sup>37</sup> Although the context of the present book is the political-military frontier, the primary goal is not to follow how the political situation was changing, an approach that has to a large extent already been taken by others in the past decades,<sup>38</sup> but rather to discuss the impacts the political-military organization had on the environment of the examined area. As part of the discussion, this volume will also consider not only the immediate frontier but also their hinterlands, the history of which is intertwined with the war zone.<sup>39</sup>

## 1.2 The Development of the Ottoman-Hungarian Frontier – The Scene

The study of the environmental history of the early modern period in Hungary is greatly affected by the periodization that structures political

36 Eduardo Manzano Moreno, “The Creation of a Medieval Frontier: Islam and Christianity in the Iberian Peninsula, Eighth to Eleventh Centuries,” in *Frontiers in Question*, 35. Most importantly, see Naomi Standen, “Introduction. Nine Case Studies of Pre-Modern Frontiers,” in *Frontiers in Question*, 23.

37 See its criticism in medieval and early modern contexts in respectively: Curta, “Introduction,” 9, and Raingard Esser and Steven G. Ellis, “Introduction,” in *Frontier and Border Regions*, 12.

38 See the author cited in the next section.

39 Cf. *The Resilient City in World War II. Urban Environmental Histories*, eds. Simo Laakkonen et al. (Cham: Springer International Publishing and Palgrave MacMillan, 2019).



history. The archives in Hungary follow various chronological conventions of political history, as a result of which entirely different structures apply to the study of the periods before and after the Battle of Mohács, the decisive Ottoman defeat of the Hungarians on 29 August 1526. This rigid structure allows little room for discussing long-term processes in the late medieval and early modern periods such as changes in land-use patterns, vegetation, and so on. The study of the period of the Ottoman presence in the Carpathian Basin has traditionally been divided among the Principality of Transylvania, the Kingdom of Hungary, and the Ottoman Empire, which in many cases requires different language skills and research methods. Furthermore, different archival systems must be understood and different questions have been raised in the context of these three political entities.

Before turning to the actual changes in the environmental conditions in the Ottoman-Hungarian frontier zone, a brief overview of the political environment in which these changes occurred is necessary. The immediate political context of the present book is the fall of the medieval Kingdom of Hungary and the partial occupation of the country by the Ottomans. The late medieval Kingdom of Hungary, in the period between 1490 and 1526, was under the rule of the Jagiellonian dynasty. Until recently, the period had been retrospectively regarded as a crisis period with weak royal power and a period of complete disrepair.<sup>40</sup> According to the traditional narrative of Hungarian historiography, this crisis led to the loss of more and more fortifications to the Ottomans at the southern ends of the country, which culminated in the major defeat at the above-mentioned battlefield of Mohács on the 29<sup>th</sup> of August in 1526.<sup>41</sup> In the past few years, a group of young scholars have begun studying the personnel of the leading elite and

40 See the recent studies of Tibor Neumann shedding new light on the rule of mostly King Vladislas II. Most importantly: Tibor Neumann, “Királyi hatalom és országgyűlés a Jagelló-kor elején” [Royal power and diets in the beginning of the Jagiellonian period], in *Rendiség és parlamentarizmus Magyarországon: A kezdetektől 1918-ig* [Estates and parliaments in Hungary: from the beginnings to 1918], eds. Tamás Dobszay et al. (Budapest: Argumentum Kiadó, 2013), 46–54.

41 On the Battle of Mohács, see Gábor Ágoston, “Mohács,” in *The Seventy Great Battles of All Time*, ed. Jeremy Black (London: Thames & Hudson, 2005), 100–112, János B. Szabó and Ferenc Tóth, *Mohács 1526. Soliman le Magnifique prend pied en Europe central* (Paris: Économica, 2009). On the period in general: Géza Perjés, *The Fall of the Medieval Kingdom of Hungary: Mohács 1526 – Buda 1541* (War and Society in East Central Europe, 26 = Atlantic Studies on Society in Change, 56 = East European Monographs, 255) (Boulder, CO: East European Monographs, 1989), Géza Pálffy, *The Kingdom of Hungary and the Habsburg Monarchy in the Sixteenth Century* (East European Monographs, 735 = Center for Hungarian Studies and Publications Series, 18), translated by J. Thomas and Helen D. DeKornfeld (Boulder, CO and Wayne, NJ: Social Science Monographs, Center for Hungarian Studies and Publications, Inc., 2009), 35–52.



the royal courts in the Jagiello period, which in the long run will hopefully lead to a complete re-assessment of royal power in that period. Their preliminary results already indicate that the interpretation of this period as a crisis very much stems from the association of the Jagiello kings with the Ottomans' expansion towards this part of Central Europe.<sup>42</sup> This stems from the fact that earlier research drew mostly on narrative sources, but the legal evidence that constitutes the overwhelming majority of the written material surviving from this period was to a large extent omitted. Written after the defeat at Mohács and during the presence of the Ottomans in Hungary, the chroniclers saw the period of King Matthias (1458–1490) as a heyday because the Ottoman advancement came to a halt during his reign, partly due to internal struggles in the Empire. Compared to Matthias's reign, the periods in which Vladislas II (1490–1516) and Louis II (1516–1526) ruled were considered to have paved the road to the defeat at Mohács and the loss of Hungary's independence. As it has been argued more recently, the Ottoman advancement was probably inevitable in the early sixteenth century, the question instead being when – rather than if – it would take over Hungary.<sup>43</sup>

The decades after the Battle of Mohács were one of the most critical periods in the history of the Kingdom of Hungary: apart from the recurrent Ottoman campaigns in the territory of Hungary and Croatia, a serious succession crisis unfolded as well. Both John Szapolyai (1526–1540) and Ferdinand I of Habsburg (1526–1564) were crowned as kings of Hungary, the former in 1526 and the latter in 1527. Both coronations were considered lawful, as they fulfilled the coronation requirements (i.e., crowned at Fehérvár with the Hungarian Holy Crown by the archbishop of Esztergom – or, in its vacancy or absence, the eldest bishop). The next one and a half decades brought civil war to the territory of the Kingdom of Hungary, with recurrent military

42 E.g., see the studies of Tibor Neumann on the Szapolyais.

43 Ferenc Szakály, "Phases of Turco-Hungarian Warfare before the Battle of Mohács (1365–1526)," *Acta Orientalia Academiae Scientiarum Hungaricae* 33 (1979): 65–111; Pálffy, "The Origins and Development of the Border Defence System," idem, "The Habsburg Defense System in Hungary Against the Ottomans in Sixteenth Century: A Catalyst of Military Development in Central Europe," in *Warfare in Eastern Europe, 1500–1800* (History of Warfare, 72), ed. Brian J. Davies (Leiden and Boston: Brill, 2012), 35–61, Ágoston, "Defending and Administering the Frontier," and the studies in *Fight Against the Turk in Central-Europe in the First Half of the 16<sup>th</sup> Century*, ed. István Zombori (Budapest: METEM, 2004). For the Ottoman-Hungarian military struggles up to 1526, see most recently Tamás Pálosfalvi, *From Nicopolis to Mohács: A History of Ottoman-Hungarian Warfare, 1389–1526* (The Ottoman Empire and its Heritage, 63) (Leiden and Boston: Brill, 2018) (all with much relevant literature not quoted here).



campaigns not only by the Ottomans but also by the two royal armies.<sup>44</sup> By the beginning of the 1530s, after John I had sworn an oath to the Ottoman sultan, Suleyman the Magnificent (1520–1566), it became evident to Ferdinand I that despite his military superiority over John I, he had no other choice than to try to find a way to solidify his power in the areas that were under his military control. These were the western and northern parts of the former Kingdom of Hungary. In the rest of the territories – most importantly over Transylvania – he had to accept the independent rule of John I. The armistice concluded in 1533 between Suleyman and the Habsburg brothers (Ferdinand I and the Holy Roman Emperor, Charles V) led to new Ottoman military tactics towards East-Central Europe and the Habsburg areas. Instead of a rapid occupation by military campaigns, which were attempted in 1529 and 1532 and had caused significant destruction in the Western areas of the Carpathian Basin, a gradual occupation of the Kingdom of Hungary became their dominant military strategy.<sup>45</sup> The Treaty of Oradea (1538) between John I and Ferdinand I again changed the political situation, as it would have allowed the Habsburgs to inherit the areas that were in the hands of the then childless, aging John I. These areas included the capital, Buda, which remained in the hands of John for the coming years, while Ferdinand took possession of many important strongholds in its immediate neighborhood including Visegrád, Esztergom, and Vác. This went against the plans of Suleyman, who instead of direct campaigns against Vienna saw greater potential in a permanent occupation of the central part of the Carpathian Basin, including Buda. The death of John I in 1540 created a new political situation in the Carpathian Basin, which indirectly led to the Ottoman occupation of Buda in 1541. In the central part of the former Kingdom of Hungary, the Ottoman Empire created its northernmost administrative unit, the vilayet of Buda. This did not mean that the eastern areas of the former Kingdom of Hungary were also integrated into the Ottoman Empire. The posthumous son of John I, John II Szapolyai (or John Sigismund) – elected king of Hungary 1540–1571 and prince of Transylvania in 1571 – was also elected king of Hungary, although his kingship was not recognized by the Hungarian, Croatian, and Slavonian estates. His rule was accepted only in Transylvania, which in the Middle Ages had been governed independently.<sup>46</sup>

44 Pálffy, *Kingdom of Hungary*, 41–48.

45 See most recently: Pál Fodor, *The Unbearable Weight of Empire. The Ottomans in Central Europe – A Failed Attempt at Universal Monarchy (1390–1566)* (Budapest: MTA BTK Történettudományi Intézet, 2015), esp. 56–94.

46 Teréz Oborni, “From Province to Principality: Continuity and Change in Transylvania in the First Half of the Sixteenth Century,” in *Fight Against the Turk*, 165–180, eadem, “Between

The 1540s was the period when the division of the former realm into three parts was crystallized, and despite a short attempt in the first half of the 1550s to reunite Transylvania with the Habsburg territories, the former polity became a semi-independent Ottoman satellite state from 1556 and remained as such for the entire length of the period this book focuses on.<sup>47</sup> In the western part of the former Kingdom of Hungary, the occupation of Buda and the Danube valley running north-south opened up new perspectives to extend Ottoman authority over large areas of the central part of the Carpathian lowlands. In the following period – from the early 1540s to 1566 – important fortifications fell to the Ottomans, which created a turbulent frontier zone between the Ottoman Empire and the Kingdom of Hungary (ruled by the Habsburgs).<sup>48</sup> In this period, no major campaigns against Vienna were initiated by the sultan, but important fortifications were besieged one by one in Transdanubia as well as on the northern edges of the Great Hungarian Plain. This period – usually referred to as the “period of fortress wars” – put constant pressure on the areas this book concerns itself with. Every few years, parts of the Transdanubian territories were beleaguered by military troops, causing significant damage to the local economies.<sup>49</sup>

In 1566, the last campaign in the life of Suleyman put an end to the expansion of the Ottomans for a relatively long period. The territories occupied by Suleyman were recognized by the Habsburgs in the Treaty of Adrianople signed in 1568. This eight-year peace treaty concluded between Selim II (1566–1574) and the representatives of King Maximilian I (1564–1574) consolidated the situation and won some time for the Habsburgs to work out a long-term defense strategy to protect the remaining parts of the Kingdom

Vienna and Constantinople: Notes on the Legal Status of the Principality of Transylvania,” in *The European Tributary States of the Ottoman Empire in the Sixteenth and Seventeenth Centuries* (The Ottoman Empire and Its Heritage: Politics, Society and Economy; 53), eds. Gábor Kármán and Lovro Kunčević (Leiden and Boston: Brill, 2013), 67–89, and most recently, see the studies in the volume: *Isabella Jagiellon, Queen of Hungary (1539–1559)*. *Studies*, eds. Ágnes Máté and Teréz Oborni (Budapest: Bölcsészettudományi Kutatóközpont, 2020).

47 Teréz Oborni, “Le royaume des Szapolyai, du royaume de Hongrie orientale a la principauté de Transylvanie (1541–1571),” *Histoire, Economie et Société Époques Moderne et Contemporaine* 34, no. 3 (2015): 65–77.

48 Pálffy, “The Origins,” idem, “The Habsburg Defense System in Hungary,” and Fodor, *The Unbearable Weight of Empire*, esp. Ch. 2.

49 Éva Simon, *A hódoltságon kívüli „hódoltság”. Oszmán terjeszkedés a Délnyugat-Dunántúlon a 16. század második felében* [Ottomans outside of Ottoman Hungary. Ottoman expansion in the southeast Transdanubia in the second half of the sixteenth century] (Budapest: MTA Bölcsészettudományi Kutatóközpont, 2014), Pálffy, *The Kingdom of Hungary*, Ch. 6.



of Hungary, with Vienna in its hinterland. As scholarship has shown, this new defense strategy was to a large extent planned by a talented military officer from Alsace, Lazarus Freiherr von Schwendi.<sup>50</sup> His role shows that the Habsburgs were thinking of creating a lasting plan to block the further advancement of the Ottomans towards Hungary.

In the second half of the 1560s and in the 1570s, the defense system of the Kingdom of Hungary was solidified by the construction or rebuilding of more than a hundred fortifications from the Adriatic Sea, through Transdanubia, to Upper Hungary. This chain of fortifications was a huge financial burden to the Habsburgs. A similar system was also built on the Ottoman side, although with significantly fewer fortifications.<sup>51</sup> These fortifications were built in an area that had not previously been contested by the two powers. Accordingly, this process resulted in a significant reorganization of the local landscapes. The period between 1568 and 1591 – in which a new war broke out between the Ottoman Empire and the Habsburgs that also involved Transylvania – as well as the period after 1606 is mostly referred to as the period of “wars of the peace years” (*Kleinkrieg*) with an interruption at the turn of the sixteenth century, which brought a rather bloody war involving all three polities in the Carpathian Basin, the Fifteen Years’ War, or Long War (1591–1606).

Despite changes in the organization of the military administration, especially following the major war council of 1577 held in Vienna, the most important feature of the period between 1568 and 1691 as well as the period between 1606 and 1663 for the present analysis is the permanent presence of major garrisons on both sides of the frontier. The key problems in the frontier

50 Thomas Niklas, *Um Macht und Einheit des Reiches: Konzeption und Wirklichkeit der Politik bei Lazarus von Schwendi, 1522–1583* (Husum: Matthiesen, 1995) and more recently: Géza Pálffy, “Un penseur militaire alsacien dans la Hongrie au XVI<sup>e</sup> siècle: Lazare baron von Schwendi (1522–1583),” in *La pensée militaire hongroise à travers les siècles*, eds. Hervé Coutau-Bégarie and Ferenc Tóth (Paris: Economica, 2011), 41–59.

51 On the costs and financing of the Habsburg defense system, see Peter Rauscher, “Kaiser und Reich. Die Reichstürkenhilfen von Ferdinand I. bis zum Beginn des Langen Türkenkriegs (1548–1593),” in *Finanzen und Herrschaft. Materielle Grundlagen fürstlicher Politik in den habsburgischen Ländern und im Heiligen Römischen Reich im 16. Jh.* (Veröffentlichungen des Instituts für Österreichische Geschichtsforschung, 38), eds. Friedrich Edelmayer, Maximilian Lanzinner, and Peter Rauscher (Vienna: Oldenbourg, 2003), 45–83, esp. 62. Pálffy, *The Kingdom of Hungary*, 129–134. István Kenyeres, “A török elleni küzdelem finanszírozása Buda elestétől a drinápolyi békéig” [The financing of the anti-Ottoman struggles from the fall of Buda to the treaty of Adrianople], in *Mozgófrontvonalak. Háború és diplomácia a várháborúk időszakában, 1552–1568* [Moving front lines. War and diplomacy in the period of the fortress wars, 1552–1568] (Studia Agriensia, 35), eds. Györgyi Bujdosné Pap, Ingrid Fejér, and Ágota H. Szilárd (Eger: Dobó István Vármúzeum, 2017), 19–40 and special issue of *Századok* on military-fiscal state in Central Europe 152, no. 5 (edited by István Kenyeres).



zone were the recurrent raids on both sides. These raids, with captives and various goods taken, provided a huge income to the usually underpaid mercenaries.<sup>52</sup> Even though there was no further Ottoman advancement to new parts of the former Kingdom of Hungary in this period, a relatively broad strip of the central part of the Carpathian Basin was regularly exposed to raids by smaller military troops.<sup>53</sup>

The period between 1591 and 1606 again changed the status quo, and apart from the continuing presence of the fortifications' garrisons (which housed significantly more soldiers than they did before or after), major military campaigns took place both in Transdanubia and on the edges of the Great Hungarian Plain.<sup>54</sup> The war brought pressure on a new scale to the people who lived in the plain areas of the Carpathian Basin. The military campaigns of the 1540s to the 1560s brought large armies to the territory of the Kingdom of Hungary, but such campaigns only took place every few years and started only in the spring and ended in the autumn. However, this time large armies overwintered in the Carpathians, putting immense pressure on local societies. The Tatars and Heiducks and other military troops were associated with violent acts against the civilian population.<sup>55</sup> The period brought a demographic crisis in many parts of the Basin.<sup>56</sup> The war concluded

52 Géza Pálffy, "A rabkereskedelem és rabtartás gyakorlata és szokásai a XVI–XVII. századi török–magyar határ mentén. (Az oszmán–magyar végvári szokásjog történetéhez)" [Practices and customs of captive-trade and captive keeping along the 16<sup>th</sup>–17<sup>th</sup>-century Ottoman-Hungarian frontier (To the customary law of the Ottoman-Hungarian frontier region)], *Fons. Forráskutatás és Történeti Segédudományok* 4 (1997): 5–78 and Ilona Tarkó, "Rabkereskedelem és anyagi kultúra a XVI–XVII. században a Batthyány család levéltára alapján" [The Ottoman Slave Trade and Material Culture in the Sixteenth to Seventeenth Century According to the Family Archive of the Batthyánys] (PhD diss., Pázmány Péter Catholic University, 2012).

53 See the works of Péter Illik on the topic. See also the special issue of the *Hungarian Historical Review* 4, no. 2 (2015) [Cultures of Christian-Islamic Wars in Europe (1450–1800)], edited by Gabriella Erdélyi.

54 Caroline Finkel, *The Administration of Warfare: The Ottoman Military Campaigns in Hungary, 1593–1606* (Vienna: VWGÖ, 1988), Jan Paul Niederkorn, *Die europäischen Mächte und der 'Lange Türkenkrieg' Kaiser Rudolfs II. 1593–1606* (Archiv für Österreichische Geschichte, 135) (Vienna: Verlag der Österreichischen Akademie der Wissenschaften, 1993).

55 For the Tatar presence: Mária Ivanics, *A Krími Kánság a tizenöt éves háborúban* [The Crimean Tatar Khanate in the Fifteen Years' War] (Kőrösi Csoma kiskönyvtár, 22) (Budapest: Akadémiai, 1994). On French soldiers in the Carpathian Basin: Péter Sahin-Tóth, "La France et les français face à la 'longue guerre' de Hongrie (1591–1606)," 2 vols. (PhD diss., Université François-Rabelais, 1997), and Brian Sandberg, "Going Off to the War in Hungary: French Nobles and Crusading Culture in the Sixteenth Century," *Hungarian Historical Review* 4 (2015): 346–383.

56 Géza Dávid, "Magyarország népessége a XVI–XVII. században" [The population of Hungary in the 16<sup>th</sup>–17<sup>th</sup> centuries], in *Magyarország történeti demográfiaja (896–1996)* [Historical demography of Hungary], ed. József Kovacsics (Budapest: KSH, 1997), 141–171, and István H. Németh,



with slightly more territorial gain on the side of the Ottomans than on that of the Habsburgs. For some years, several fortifications changed hands both in the Great Hungarian Plain and in Transdanubia (e.g., Győr, Pápa, Tata, Fehérvár), but when signing the peace treaty, the Ottomans took possession of a very important fortification, Kanizsa. As will be argued in Chapters 2 and 3, the loss of this fortress to the Ottomans had a significant role in the transformation of the landscape in the central part of western Transdanubia. The Habsburgs, however, managed to take back some important castles in the Northern Hungarian Mountain areas and Upper Hungary such as Filakovo, Szécsény, or Nógrád, but more importantly, the war showed the equalization of the military potential of the two major realms. The period following the peace treaty of Zsitvatorok in 1606 brought a period of peace much like in the last third of the sixteenth century. In the seventeenth century, with the Habsburgs involved in the Thirty Years' War (1618–1648) in Central Europe and the longer periods without a threat of a major Ottoman campaign, there was a slow but steady decrease in the garrisons of the frontier fortifications. Instead of the 22,000 troops during the sixteenth century, only about 17,000 soldiers were present in the Habsburg-Hungarian borderline fortifications, and the number of fortifications also decreased from c. 120 to less than 90.<sup>57</sup> The short war period of 1663 to 1664 and the capture of one of the most important strongholds of the Habsburgs in defending Vienna, Nové Zámky in present-day Slovakia, led to a rapid reorganization of the frontier north of the Danube. Nonetheless, it did not seriously impact Transdanubia, where the fortification system remained basically the same from 1606 to the 1680s. The last Ottoman effort to capture Vienna in 1683 and its lasting yet unsuccessful siege set the stage for the recapture of the Kingdom of Hungary. The 1680s and the 1690s brought a series of major Habsburg military campaigns during which most of the territories that were under the authority of the late medieval kings of Hungary were regained by the Habsburgs. The first phase of the re-conquering war was concluded in 1699 with the Treaty of Karlowitz, which except for the almost entirely uninhabited Banate (Temesköz) restored

“Háború és népesség a kora újkori Magyarországon (16–17. század)” [War and population in early modern Hungary, Sixteenth to Seventeenth centuries], in *Történeti demográfiai évkönyv 2001* [Historical demography yearbook, 2001], eds. Tamás Faragó and Péter Óri (Budapest: KSH Népeségstudományi Kutatóintézet, 2001), 129–141.

57 Géza Pálffy, “The Origins and Development of the Border Defence System Against the Ottoman Empire in Hungary (Up to the Early Eighteenth Century),” in *Ottomans, Hungarians, and Habsburgs in Central Europe: The Military Confines in the Era of the Ottoman Conquest* (The Ottoman Empire and its Heritage, Politics, Society and Economy, 20), eds. Géza Dávid and Pál Fodor (Leiden, Boston, and Cologne: Brill, 2000), 59.



the borders of the medieval Kingdom of Hungary in the south. By this time, the military campaigns in the central part of the Carpathian had drawn to a close and the political-administrative structure of the area was under a full re-organization, which only took place in the 1710s, however, following a Hungarian war of independence between 1703 and 1711.

The nature of the war discussed in the previous pages is somewhat different from that of modern-time wars, which seldom lasted more than a few years. Although its intensity differed from that of modern wars, recurrent military operations took place for more than 150 years in the central part of the Carpathian Basin, significantly impacting the environment. The book addresses the ways this war changed the landscape, with special emphasis on the transformation along the frontier. To do so, we need to first deepen our understanding of the type of landscape that was prevalent in the area, which is discussed with the use of case studies.

### 1.3 Transdanubia and the Great Hungarian Plain – The Setting of the War

The Kingdom of Hungary at the end of the Middle Ages covered most of the Carpathian Basin. The area was a well-defined geographical unit that was also relatively well-protected from many directions. From the northwestern to the southern edges, most of the basin is bordered by the Carpathian Mountains. The mountains are well above 2000 meters in many areas, which limited access to a few passes from the north, east, and southeast. To the west, the Basin is bordered by the foothills of the Alps and on the south by the Sava and Danube rivers, which provided better access to the central parts of the Basin.

The basin is divided up by its main rivers, the Danube and the Tisza. The westernmost area, west of the Danube which flows from north to south, is called Transdanubia. The area between the Danube and the Tisza is usually referred to as Danube–Tisza Interfluve (*Duna–Tisza-köze*), while the areas east of the Tisza (bordering the highlands in Transylvania) is called Transtisza (*Tiszántúl*) (see Fig. 1.1). The term Transdanubia was used from the Ottoman period onwards. Its name derives from the fact that, viewed from Bratislava, the new capital of the Kingdom of Hungary was located on the other side (the left bank) of the Danube.<sup>58</sup> The Ottoman presence in the early

58 Pál Engel, *The Realm of St. Stephen. A History of Medieval Hungary, 895–1526*, trans. Tamás Pálosfalvi (London and New York: I.B. Tauris, 2001), xxiii. For Bratislava as capital, see Géza Pálffy,

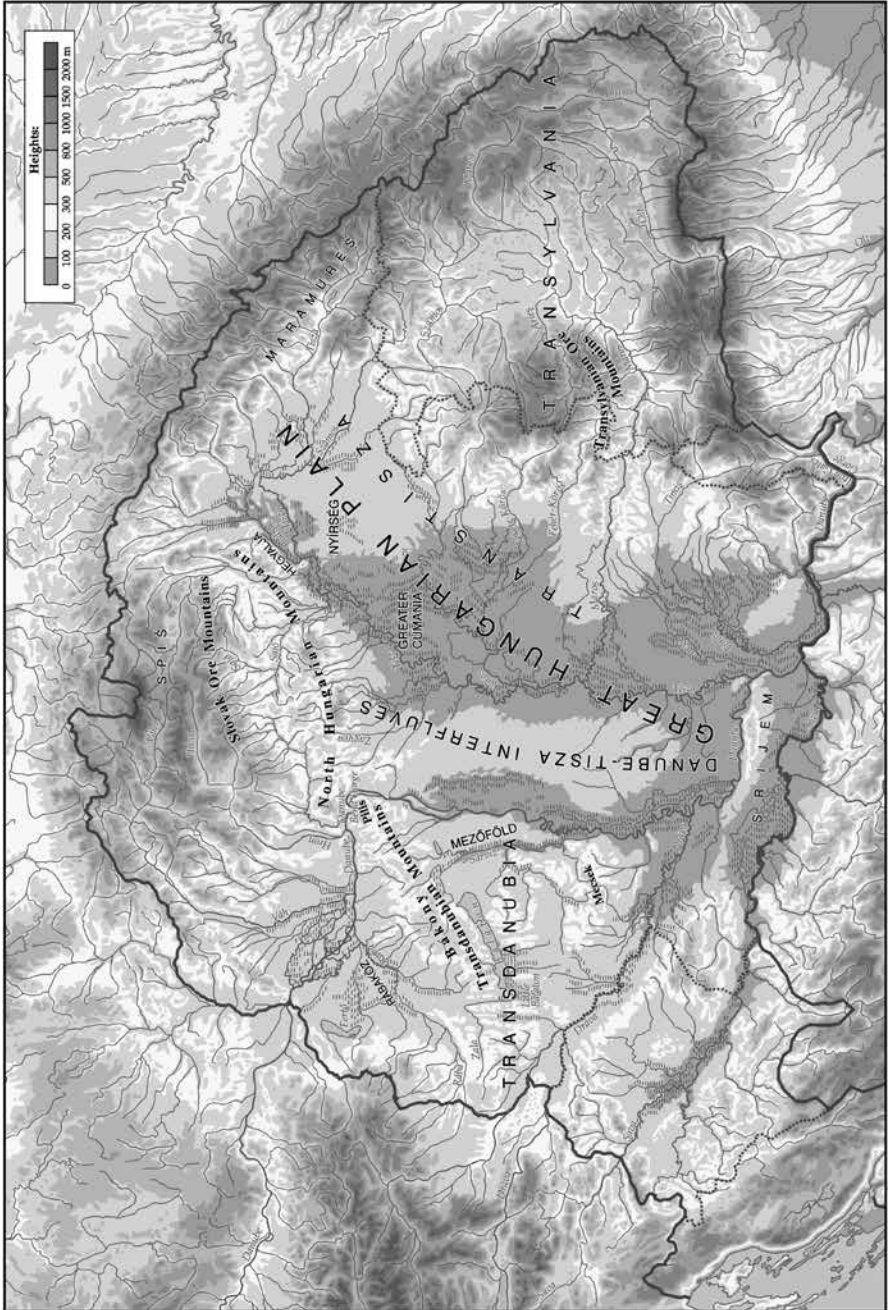


Figure 1.1 Major geographical units of the Carpathian Basin (drawn by Béla Nagy)

modern period covered the whole of the Danube–Tisza Interfluve, and major parts of both the Transdanubia and the Transtisza regions were also under their authority. The easternmost area of the Carpathian Basin is a highland scattered by mountains that in the early modern period belonged to the Principality of Transylvania. The northern part of the basin, again a highland with numerous mountain ranges, was called Upper Hungary (covering mostly present-day Slovakia) in the early modern period. This territory was particularly important both in the medieval and the early modern period because apart from having been rich in forests, it had significant precious metal deposits such as copper and other ferrous metals.

The central part of the basin area – covering a small part of Transdanubia, the whole of the Danube–Tisza Interfluve, and the Transtisza region – was an almost completely flat lowland called the Great Hungarian Plain. Considerable parts of this lowland were not suited to crop production, partly because they either belonged to the lower floodplain areas and were recurrently inundated or because they were prone to salination. There were areas such as the southern part of the Danube–Tisza Interfluve, however, which had one of the highest yielding crop fields in the Carpathian Basin in the past millennium.

Difficult to defend, the lowland of the Great Hungarian Plain was by the second half of the sixteenth century almost fully controlled by the Ottomans, and a new military frontier came into existence along the edges of the plain area (see Fig. 1.2). This new frontier ran from the Adriatic Sea through Croatia and divided Transdanubia into two parts. It crossed the lowland areas of the Danube–Tisza Interfluve and ran south to the line of the Danube on the eastern margin of the plains.<sup>59</sup> This more than 1,000-kilometer-long

“A Magyar Királyság új fővárosa: Pozsony a XVI. században” [The new capital of the Kingdom of Hungary: Bratislava in the 16<sup>th</sup> century], *Fons. Forráskutatás és Történeti Segéd Tudományok* 20 (2013): 3–76.

59 On the organization of the frontier on the two sides, see Pálffy, “The Origins,” William O’Reilly, “Border, Buffer and Bulwark. The Historiography of the Military Frontier, 1521–1881,” in *Frontiers and the Writing of History, 1500–1850*, eds. Steven G. Ellis and Raingard Esser (Hanover: Wehrhahn, 2006), 229–244 (both with rich reference to the existing literature). See for the Ottoman standpoint: Hegyi, *A török hódoltság várai*, Gábor Ágoston, “Ottoman Conquest and the Ottoman Military Frontier in Hungary,” in *A Millennium of Hungarian Military History*, 85–110, Gábor Ágoston, “The Ottoman Empire and Europe,” in *The Oxford Handbook of Early Modern European History: 1350–1750. Volume II. Cultures and Power*, ed. Scott M. Hamish (Oxford: Oxford University Press, 2015), 612–637, and Gábor Ágoston, “Defending and Administering the Frontier: The Case of Ottoman Hungary,” in *The Ottoman World*, ed. Christine Woodhead (Milton Park, Abingdon, and Oxon: Routledge, 2012), 220–236. See also: Mark L. Stein, *Guarding the Frontier Ottoman Border Forts and Garrisons in Europe* (London and New York: I.B. Tauris, 2007), esp. 13–28.



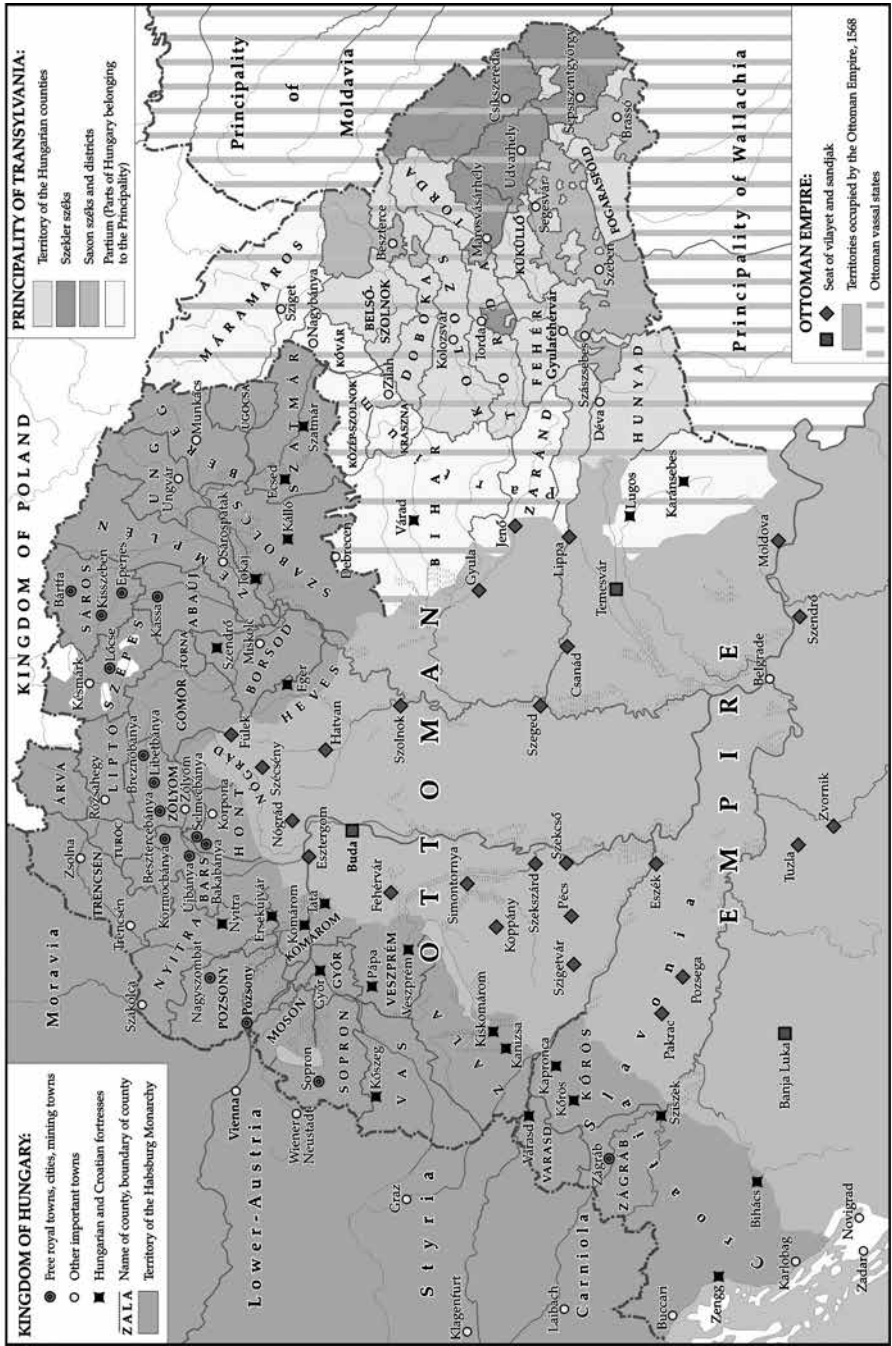


Figure 1.2. The Ottoman Empire and the Kingdom of Hungary in the second half of the sixteenth century (drawn by Béla Nagy)

frontier and its environmental transformations are the main focus of the present book. Being rather long, this frontier called for a complex defense system on the sides of both the Hungarians and the Ottomans. A detailed study of the environmental history of the entire frontier lies outside the limits of a work like this one, so I have chosen western Transdanubia as a study area because it is the best documented in sources as well as equipped with the densest network of fortifications from the mid-sixteenth century, potentially putting more pressure on the environment than anywhere else in the Basin. However, as mentioned earlier, I will have a brief look at both the hinterlands on the Ottoman side of the border – that is, the plains of the Great Hungarian Plain – and the hinterlands in Transdanubia, which belonged to the authority of the Hungarian kings during the whole of the period studied here.

Geographically, Transdanubia can be characterized as a mosaic landscape, unlike the Danube–Tisza Interfluve or the Transtisza region, which both belong to the lowland of the Great Hungarian Plain. Changes in the environment during the presence of the Ottomans in the Great Hungarian Plain have already been addressed, but the processes in this area may have been quite different from what can be observed in Transdanubia.<sup>60</sup> Bordered by the Dráva River on the south, the Danube on the east and the north, and the foothills of the Alps to the west, Transdanubia has at least three quite distinctive landscapes. The eastern and southern areas belong geographically to the Great Hungarian Plain called *Mezőföld* and Dráva Plain respectively. These areas, just like the Danube–Tisza Interfluve, seldom reach the height of 200 meters above sea level. While the soil of the Dráva valley is not particularly rich, the *Mezőföld*, thanks to its thick layers of loess, has rich agricultural potential. Both areas were under the authority of the Ottomans from as early as the 1540s onwards. The middle third of Transdanubia is made up of low hills, usually ranging between 200 and 700 meters in height. They became strategically important in the sixteenth century, as the frontier between the two powers ran along this hilly region, roughly from the southwest to the northeast, cutting Transdanubia into two parts. The northwestern third of Transdanubia, the Little Hungarian Plain (*Kisalföld*, meaning little lowlands in Hungarian), is again flat, with small hills scattered over the landscape. Almost 40,000 km<sup>2</sup> in area, this region is the focus of the present analysis. While Chapters 2 and 3 focus on the Little Hungarian Plain and mostly the valley of its most significant river called Rába, which to a large extent marked the frontier of the two

60 See section 4.1.



polities in the seventeenth century, the emphasis of Chapter 4 is on a more extensive geographical unit: the whole of Transdanubia, with a look at the Great Hungarian Plain as well.

The Rába River originates in the Eastern Alps (Friesbacher Alps) and runs into the Mosoni Danube by the town of Győr. With its catchment area of roughly 10,000 km<sup>2</sup> and a length of 300 kilometers, the Rába is the third largest river in present-day Hungary and the most important right-bank tributary of the Danube between the Enns and Dráva rivers. Its size cannot be compared to the major tributaries of the Danube in the Carpathian Basin such as the Sava or the Tisza rivers, as its average discharge is only around 80 m<sup>3</sup>/s at Győr.<sup>61</sup> Most of its water comes from the Austrian part of its catchment, and therefore the flood regime of the river is closely connected with the snowmelt and the precipitation maxima in the Alpine region.<sup>62</sup> The section of the river most thoroughly examined in this book is important in terms of its flood discharge because the Rába flows through a more extensive plain area after reaching the foothills of the Alps there. Here, on the Little Hungarian Plain, the river has enough space to meander, while upstream (in present-day Austria) it flows along a rather narrow riverbed. This area was chosen as the focus of this study because the nature of the location and the hydromorphological conditions of the river made it an important strategic point in the frontier zone. From the Fifteen Years' War onwards, defense was often built on rivers, particularly the River Rába.<sup>63</sup>

The almost two centuries of war and recurrent military activities from the early sixteenth to the early eighteenth centuries accompanied fundamental

61 Gergely Szalay and Endre Szilágyi, *Magyarország vizeinek műszaki-hidrológiai jellemzése: Mosoni-Dunaág, Rába* [The technological – hydrological analysis of the waters of Hungary. Mosoni Danube, Rába] (*Magyarország vizeinek műszaki-hidrológiai jellemzése*) (Budapest: Vízgazdálkodási Intézet, 1989), Pál Ambrózy, “A Felső-Rába vízgyűjtőjének éghajlati jellegzetességei” [Climatic specificities of the catchment area of the Upper Rába], *Vízügyi Közlemények* 79 (1997): 498–517, László Goda and Vilmos Vasvári, “A Felső-Rába vízjárásának statisztikai jellemzése” [Statistical analysis of the water-regime of the Upper Rába], *Vízügyi Közlemények* 79 (1997): 518–538, and Zoltán Károlyi and Sándor Somogyi, “Felszíni vízfolyások” [Above ground waters], in *A Kisalföld és a nyugat-magyarországi peremvidék* [Little Hungarian Plain and the Western Hungarian Highlands] (*Magyarország tájféldrajza*, 3) (Budapest: Akadémiai, 1975), 104, and 107–111.

62 Heinz Bergmann et al., *Hydrologische Monographie des Einzugsgebietes der Oberen Raab – A Felső-Rába vízgyűjtőjének hidrológiai monográfiája* (Schriftenreihe zur Wasserwirtschaft, 23) (Graz and Budapest: Technische Universität Graz, 1996).

63 Zrínyi-Újvár. *A Seventeenth-Century Frontier Defensive System on the Edge of the Ottoman Empire*, eds. Gábor Hausner and András Németh (Budapest: Dialóg Campus, 2020), and József Kelenik, “A kanizsai övezet és természetföldrajzi adottságai a XVI. század 70-es éveinek végén” [The Kanizsa region and its geographical conditions in the 1570s], in *Végvár és környezet*, 163–174.



transformations to the economy, the demography, the ethnic composition, as well as the religious life of the Carpathian Basin. While these aspects have all been at least partially examined by scholars, the subject of how the environmental conditions changed in this period has not been the focus of many scholarly works.

#### 1.4 The Book's Concept

The transformation of the environmental conditions of the Carpathian Basin and the frontier zone in the sixteenth and seventeenth centuries has usually been considered in the context of economic and political crises. As discussed above, the Late Middle Ages were seen as a period of a political crisis. Similarly, scholars usually perceived the period after the expulsion of the Ottomans from the central basin area as a general crisis in which the Habsburg authorities had to make huge efforts to “rebuild” the country, which also included interventions to the environment. This entailed channeling rivers, draining marshlands, turning fallows to plowlands, etc. These efforts were interpreted as answers to the crisis directly or indirectly associated with the Ottoman presence. Without going into much detail on the notion of *crisis*, which has been widely discussed in recent scholarship, it is certainly worth considering the above-mentioned processes from a different perspective and looking at the phenomenon of adaptation (or resilience), which has also attracted attention in recent environmental history studies.<sup>64</sup> The change in the political and economic structures and the environmental conditions in the Ottoman period can be understood as a crisis but also as a new challenge requiring different responses from both local societies and larger polities to which different groups adapted in dissimilar ways.<sup>65</sup>

64 See, e.g., Daniel Curtis, *Coping with Crisis. The Resilience and Vulnerability of Pre-Industrial Settlements* (Burlington, VT: Ashgate, 2014).

65 Cf. *Natural Disasters, Cultural Responses. Case Studies Toward a Global Environmental History*, eds. Christof Mauch and Christian Pfister (Plymouth: Lexington Books, 2009). In regional context, see Zsolt Pinke, “Alkalmazkodás és felemelkedés – modernizáció és leszakadás: Kis jégkorszaki kihívások és társadalmi válaszok a Tiszántúlon” [Adaptation and Rise – Modernization and Decline: Little Ice Age Challenges and Social Responses on the Trans-Tisza Region (Hungary)] (PhD diss., Pécsi Tudományegyetem, 2014). On the notion of crisis, see furthermore: Ansgar Nünning, “Krise als Erzählung und Metapher: Literaturwissenschaftliche Bausteine für eine Metaphorologie und Narratologie von Krise,” in *Krisengeschichte(n): ‘Krise’ als Leitbegriff und Erzählmuster in kulturwissenschaftlicher Perspektive* (Beihefte der Vierteljahrschrift für

In the few rather basic works on the landscape and environmental history of early modern Hungary, three relatively distinct topics are discussed, usually all in the context of crisis: weather and climate, forests, and water management.<sup>66</sup> Until recently, most of the works revolving around the role the wars played in the Ottoman-period environmental changes started with a discussion of the long-term changes in the climatic conditions.<sup>67</sup> In their narratives, the period of the Ottoman presence in the Carpathian Basin coincided with the most frequently examined climatic shift in the Holocene apart from recent global warming, the Little Ice Age. Despite major differences in its regional periodization and characteristics, the Little Ice Age is considered to have had an impact throughout the Northern Hemisphere and to have contributed to different crises including the so-called global crisis of the seventeenth century.<sup>68</sup> Partly along these lines, research in East-Central Europe, more specifically in Hungary, also considers the entire sixteenth and seventeenth centuries as a period of significant climatic stress and even as a subsistence crisis.<sup>69</sup> Even though promising new research has been conducted in recent years, most of the studies that discuss the Little

Sozial- und Wirtschaftsgeschichte, 210), eds. Carla Meyer, Katja Patzel-Mattern, and Gerrit Jasper Schenk (Stuttgart: Steiner, 2013), 117–144, esp. 126.

66 The few but notable exceptions include: Béla Iványi, *Képek Körmend multjából | Expraeteritis oppidi Körmend* (Körmendi füzetek, 4) (Körmend: „Rábavidék” nyomda és lapkiadóvállalat, 1943), idem, *Részletek a magyarországi fertőző betegségek történetéből. Adatok a körmendi levéltárból, a pestis XVI–XVII. századi történetéhez /1510–1692/* [On the history of contagious diseases in Hungary. Data on the sixteenth to seventeenth-century history of pestilence in the archive of Körmend (1510–1692)] (Communicationes ex Bibliotheca Historiae Medicae Hungarica. Supplementum, 3) (Budapest: Országos Orvostörténeti Könyvtár, 1965). See also the frontier defense history conferences held at Noszvaj and their proceeding volumes, such as Petercsák and Szabó, *A végvárak és régiók*, and Petercsák and Pető, *Végvár és környezet*, and most recently: Hausner and Németh, *Zrínyi-Újvár*.

67 E.g., Lajos Rácz, “The Price of Survival. Transformations in Environmental Conditions and Subsistence Systems in Hungary in the Age of Ottoman Occupation,” *Hungarian Studies* 24, no. 1 (2010): 21–39, Zoltán Péter Bagi, “The Life of Soldiers during the Long Turkish War (1593–1606),” *The Hungarian Historical Review* 4 (2015): 384–417.

68 See most of all Parker, *Global Crisis*. See also Dagomar Degroot’s work on the impact of the Little Ice Age on wars in the Dutch Republic: idem, “The Frigid Golden Age.”

69 E.g., R. Várkonyi, *Pelikán a fiaival*, eadem, “Környezet és végvár,” eadem, “A párbeszéd esélyei,” Ágnes R. Várkonyi, “‘A természet majd az értelemmel ...’ Történeti ökológia és a XVIII. századi Magyarország környezeti válsága” [‘Nature with conscience...’ Historical ecology and the environmental crisis of Hungary in the eighteenth century], in *Környezettörténet: Az utóbbi 500 év környezeti eseményei történeti és természettudományi források tükrében* [Environmental history. The environmental events of the last 500 years in the light of historical and scientific data] (Környezettörténet, 1), ed. Miklós Kázmér (Budapest: Hantken, 2009), 21–54, Rácz, “The Price of Survival,” and idem, *The Steppe to Europe. An Environmental History of Hungary in the Traditional Age* (Cambridge: White Horse Press, 2013), 125–177, esp. 137–140 and 174–177.

Ice Age still use old weather compilations such as the one by Antal Réthly,<sup>70</sup> a meteorologist in the mid-twentieth century, and his data as interpreted by Lajos Rácz and others in the 1990s and early 2000s.<sup>71</sup> Even if the main trends sketched out following the footsteps of Réthly were accurate, such as the coincidence in time between the coldest periods of the Little Ice Age in the Carpathian Basin and the coldest periods in Western Europe, at least two points are still problematic in these works. First, they mostly disregard that the Little Ice Age had a wide variety of impacts on many aspects of society, from political life through material culture to settlement networks and economic opportunities. These works argue, usually without an actual understanding of the characteristics of the Little Ice Age in the area they address, that it hurt local economies. Second, scholarship in many cases uncritically attributes individual weather events – like a cold spell, an extremely cold summer or month, etc. – to the Little Ice Age.<sup>72</sup>

70 Antal Réthly, *Időjárási események és elemi csapások Magyarországon 1700-ig* [Weather events and natural disasters in Hungary until 1700] (Budapest: Akadémiai, 1962), idem, *Időjárási események és elemi csapások Magyarországon 1701–1800-ig* [Weather events and natural disasters in Hungary from 1701 to 1800] (Budapest: Akadémiai, 1970), and idem, *Időjárási események és elemi csapások Magyarországon 1801–1900-ig*, 2 vols. [Weather events and natural disasters in Hungary from 1801 to 1900] (Budapest: OMSZ, 1998). For the methodological problems of the data collection, see Andrea Kiss, “Historical Climatology in Hungary: Role of Documentary Evidence in the Study of Past Climates and Hydrometeorological Extremes,” *Időjárás* 113 (2009): 317–320.

71 Lajos Rácz, *Climate History of Hungary since 16<sup>th</sup> Century: Past Present and Future* (Discussion Papers, 28) (Pécs: Centre for Regional Studies of the Hungarian Academy of Sciences, 1999), idem, *Magyarország éghajlattörténete az újkor idején* [Climate history of Hungary in the Modern times] (Szeged: Juhász Gyula Felsőoktatási Kiadó, 2001). See also: Judit Bartholy, Rita Pongrácz, and Zsófia Molnár, “Extremes and Millennial Trends in the Carpathian Basin Using the Rethly Documentary Collection,” *Bulletin of the American Meteorological Society* 12 (2004): 3791–3802 and Judit Bartholy, Rita Pongrácz, and Zsófia Molnár, “Classification and Analysis of Past Climate Information based on Historical Documentary Sources for the Carpathian Basin,” *International Journal of Climatology* 24 (2004): 1759–1776.

72 See, e.g., Ágnes R. Várkonyi, “Természet és társadalom. A történeti ökológia regionális lehetőségei” [Nature and society. The regional perspectives of environmental history], *A Nógrád Megyei Múzeumok Évkönyve* 26 (2002): 345–373 and eadem, “Az öltözködés filozófiájáról” [On the philosophy of clothing], *Történelmi Szemle* 53 (2011): 503–536. See also: Zoltán Bagi, “Egy kudarc okai: Kanizsa 1601. évi ostroma” [Reasons of a failure: the siege of Kanizsa in 1601], *Aetas* 28, no. 1 (2013): 5–30, Zoltán Péter Bagi, “A folyóvíz, a csapadék és az áradások mint a hadakozást befolyásoló tényezők a tizenöt éves háború időszakában” [Rivers, precipitation, and floods as agents of military campaigns in the period of the Fifteen Years’ War], in *Víz és társadalom Magyarországon a középkortól a XX. század végéig* [Water and society in Hungary from the Middle Ages to the end of the 20<sup>th</sup> century], ed. Gergely Krisztián Horváth (Budapest: Balassi, 2014), 189–206, Bagi, “The Life of Soldiers,” and Gábor Ágoston, “Ottoman Conquest and the Ottoman Military Frontier in Hungary,” in *A Millennium of Hungarian Military History*, eds. Béla Király and László Veszprémy (Boulder, CO: Atlantic Research and Publications, 2002), 103–107.

The possible impacts of climatic fluctuations on the economic and social changes and political events occurring in the territories discussed here have been raised not only in Hungarian scholarship but recently also in the Ottoman context. In a pioneering work, Sam White attempted to provide a new interpretation to the outbreak of the Celali rebellions in the Ottoman Empire at the turn of the sixteenth century, which took place at the same time as the Fifteen Years' War.<sup>73</sup> A deeper knowledge of the climatic processes would certainly contribute greatly to the evaluation of the environmental influence of the Ottoman-Hungarian wars, as certainly the two were not independent of each other. Early twentieth-century historians attributed major landscape changes to the war, blaming the Ottomans. But then the situation changed, and from the 1980s the supposed impact of the Little Ice Age became an important cornerstone in the narrative of the changes in the landscape. Perhaps now, views are slowly moving from mono-causal reasoning to a more complex but still biased view of the changes in the main environmental conditions including climate. There are as yet no studies that consider the climate fluctuation at the time as a potential trigger of economic transformation, as a challenge to which some communities answered successfully.<sup>74</sup>

Changes in the forest cover and transformation in the waterscapes due to changing management – or a lack of management – in the early modern Carpathian Basin were brought to the attention of scholars by the prominent historian Ágnes R. Várkonyi (1928–2014). After some pioneering works by ethnographers,<sup>75</sup> she was the first to emphasize the potential environmental stress caused by the Ottoman war period. However, while hypothesizing some changes, she never actually studied the relevant source materials to test the validity of these assumptions.<sup>76</sup> According to her ideas, the changes

73 Sam White, *The Climate of Rebellion in the Early Modern Ottoman Empire* (Cambridge: Cambridge University Press, 2011).

74 Edit Sárosi, *Deserting Villages – Emerging Market Towns Settlement dynamics and land management in the Great Hungarian Plain 1300–1700* (Series Minor, 39) (Budapest: Archaeolingua, 2016).

75 Bertalan Andrásfalvy, *A Duna mente népének ártéri gazdálkodása Tolna és Baranya megyében az ármentesítés befejezéséig* [The flood plain economy of the peoples of the Danube valley in Tolna and Baranya counties before the completion of the regulation works] (Tanulmányok Tolna megye történetéből, 7) (Szekszárd: Tolna Megyei Levéltár, 1975), and for its more recent edition: idem, *A Duna mente népének ártéri gazdálkodása: ártéri gazdálkodás Tolna és Baranya megyében az ármentesítési munkák befejezése előtt* [The flood plain economy of the peoples of the Danube valley in Tolna and Baranya Counties before the completion of the regulation works]. ([Budakeszi]: Ekvilibrium, 2007).

76 On the genealogy of research in Hungary: Ágnes R. Várkonyi, “Történeti ökológia,” [Historical ecology] in *A történelem segédtudományai* [Auxiliary sciences of history] (A történettudomány

in the political structures, and most importantly the demography of some regions, created a lasting environmental crisis that necessitated the Habsburg administration's major interventions in the landscape of the Carpathian Basin. Although at some points she re-considered the sometimes strikingly anti-Ottoman tendencies in the previous literature, she did not entirely give up the idea that the formation of non-agricultural wastelands in the Great Hungarian Plain (the loss of woodlands or the extension of the water-covered areas) could largely be attributed to the activities of the Ottomans in the Carpathian Basin.<sup>77</sup> She did note, however, that some of the changes that had lasting visible impacts, like the deliberate flooding of areas around border fortifications, were equally the result of Habsburg's military strategy as in that of the Ottomans.

While the origin of the extensive wastelands (the so-called *puszta*) of the Great Hungarian Plain has been the focus of some recent studies, neither the frontier environments nor the hinterlands elsewhere in the lowlands have attracted the attention of scholars.<sup>78</sup> The environmental transformations of the Little Hungarian Plain and the Transdanubian lowlands in general, for instance, have been completely ignored in the scholarly literature even though they could have been seen as a laboratory for the impacts of the war on the environment, as the transformations occurred during the busiest phase of the wars.

In the coming chapters, I will revisit the problem partly raised by R. Várkonyi and analyze what roles the environment played in the Ottoman-Hungarian wars and what changes this lasting military conflict wrought on the natural resources. Chapter 2 looks at how the environment was considered as part of military strategies in the period when the Ottomans gradually

kézikönyve, 1), ed. Iván Bertényi (Budapest: Osiris Kiadó, 2001), 44–65. For the works of Ágnes R. Várkonyi: eadem, *Pelikán a fiaival* [Pelican with his sons] (Budapest: Liget Műhely Alapítvány, 1992), eadem, "Környezet és végvár. Végvárrendszer és a történeti ökológia kérdései a 16–17. századi Magyarországon" [Environment and border defense castles. Border defense system and questions of historical ecology in sixteenth and seventeenth century Hungary], in *A végvárak és régiók a XVI–XVII. században. Tudományos tanácskozás előadásai – Noszvaj, 1991. okt. 17–18.* [Borderline castles and regions in the sixteenth and seventeenth centuries. Proceedings of the conference held at Noszvaj, 17–18 October 1991] (Studia Agriensia, 14), eds. Tivadar Petercsák, and Jolán Szabó (Eger: Heves Megyei Múzeumok Igazgatósága, 1993), 7–27, Ágnes R. Várkonyi, "A párbeszéd esélyei. (A végvárrendszer-kutatások humánökológiai megközelítéséről)" [The chances of dialogue (on the human ecological approach to the borderline fortification research)], in *Végvár és környezet, 7–32* and eadem, "Természet és társadalom – a történeti ökológia regionális lehetőségei" [Nature and society – the regional possibilities of historical ecology], *A Nógrád Megyei Múzeumok Évkönyve* 26 (2002): 345–373.

77 R. Várkonyi, *Pelikán a fiaival*, 46–50, and eadem, "Természet és társadalom," 357–359.

78 Molnár, "Az Alföld erdei." See also Sárosi, *Deserting Villages*.

took possession of parts of Transdanubia and most of the Great Hungarian Plain in the mid-sixteenth century. Using previously unknown sources, it is argued that right from the beginning of the wars in the Carpathian Basin the local Hungarian military leaders as well as the highest-ranking officials of the Habsburgs considered the environment as an organic part of their defense strategies. Chapter 3 looks at the same region almost a century later, in the period when after the fall of Kanizsa and the end of the Fifteen Years' War the previously planned defense strategy, centered around the line of the River Rába, was put into effect. The question tackled in this central chapter is how the implementation of the military strategy influenced the water system of the Rába River.

While Chapters 2 and 3 look at riverine landscapes and the transformation of waterscapes in the frontier zone, Chapter 4 looks at the changes in the usage of another natural resource traditionally associated with the war – wood – and looks at whether or not linking the Ottoman war period to forest loss is grounded. In this chapter, the geographical focus is broader, as it not only looks at the entire region of Transdanubia but also provides some insights into the changes in the forest cover in the hinterlands, both on the Ottoman and the Hungarian sides of the frontier. The chapter's primary focus, however, is to understand the different spheres of wood consumption related to the military activities in the basin area. If ever there was an extensive area where war affected the forest cover, it was Transdanubia in the Carpathian Basin, as it not only experienced most military campaigns but also had the largest number of newly built fortifications and permanent garrisons in the one and a half century between c. 1540 and 1690, when Ottoman authority prevailed at least in parts of the region. Despite the limited geographical and temporal scope of the analyses carried out in the three main chapters of the book, the case studies aim to demonstrate the long-term environmental effects of the Ottoman presence and the recurrent military activities in the central basin area encircled by the Carpathian Mountains. In this way, we can gain a deeper understanding of what a militarized landscape in pre-modern times might entail.