Acta Orientalia Academiae Scientiarum Hung. Volume 59 (4), 407–438 (2006)
DOI: 10.1556/AOrient.59.2006.4.2

A CONTRIBUTION TO THE MILITARY REVOLUTION DEBATE: THE JANISSARIES USE OF VOLLEY FIRE DURING THE LONG OTTOMAN–HABSBURG WAR OF 1593–1606 AND THE PROBLEM OF ORIGINS*

GÜNHAN BÖREKÇİ

Department of History, Ohio State University, 230 West, 17th Avenue, Columbus, OH, 43210, U.S.A.
e-mail: borekci.3@osu.edu

According to proponents of the "Military Revolution" theory, musketry volley fire was among the military innovations that fundamentally altered early modern field warfare. The origins of European volley fire date back to the 1590s, but no western army, with the possible exception of the Dutch in 1600, was able to use this tactic in action until the 1620s. Furthermore, it has been thus far assumed that the Ottomans failed to adopt this new tactic and thus experienced setbacks in the face of their European adversaries during this period.

By utilising hitherto overlooked Ottoman narrative and visual sources, this article first shows that the Janissaries were indeed using volley fire in action in 1605, and possibly before. Secondly, it raises questions about the origins of Ottoman volley fire, which are currently unclear. Overall, the Janissaries' use of this tactic during the Long War not only affects our understanding of Ottoman warfare but also necessitates a reassessment of the patterns of invention and diffusion of military innovations in the early modern period.

Key words: volley fire, Janissaries, Long War, Ottoman warfare, military revolution debate, infantry tactics.

The "Military Revolution" theory remains a subject of intense and lively debate among scholars. Proponents of this theory maintain that a series of innovations and developments in European warfare beginning in the 15th century not only led to a set of linked transformations in western political, economic and social systems, eventually resulting in the emergence of centralised states, but also gave European armies a

* I would like to express my gratitude to Yiğit Akın, Caroline Finkel, Jane Hathaway and Kahraman Şakul, for their help, suggestions and corrections to several earlier drafts; to Gábor Ágoston, for his comments as well as for directing my attention to the relevant literature in Hungarian (which I am not able to read); and to Geoffrey Parker, for my numerous discussions with him initiated this study and provided indispensable input during the writing process. If there is any shortcoming, it solely belongs to me.

0001-6446 / $ 20.00

decisive edge to facilitate and sustain western global dominance. There is no doubt that such developments cumulatively produced a great change in the nature and scale of warfare and that the role of war and the military in the formation of modern states and societies is a very important issue. Overall, despite being criticised as technologically deterministic and chronologically problematic, this theory is valuable, for it continues to inspire and serve as an analytical tool for historians.[1]

Nonetheless, the military revolution framework advanced to explain the changes in the trajectory and patterns of post-1500 world history suffers from interrelated paradigmatic, methodological and empirical limitations. In Jeremy Black's words (2004b, p. 212), "the focus in the discussion of military revolutions is the west, the definitions are western, and in so far as non-western counterparts feature it is in order to record the success of their western counterparts. There is, indeed, a circular quality in this analysis, which is a serious methodological limitation, and one shared by an empirical failure to even note developments in other cultures". In other words, such an exclusive perspective, oriented to explain the European "success and impact" over other systems fails in analysing the complexity and diversity in early modern military history. Hence, as the flourishing literature of the New Military History emphasises, a more comprehensive and balanced view of western and non-western warfare, which gives due weight to independent developments in different military systems and theatres of war, is required to overcome such problems in the current historiography. Admittedly, this is easier said than done unless many specific aspects of warfare outside Western Europe are studied, particularly by utilising a larger pool of primary sources.

Most historians participating in the Military Revolution Debate have overlooked, for instance, the relevance of the so-called Long War of 1593–1606 between the Habsburg and Ottoman Empires in Hungary, despite the fact that for much of that period it was the only "hot war" in progress in Europe except for the secessionist struggle in the Netherlands. Scholars of early modern Hungary and the Ottoman Empire have recently criticised this neglect in European historiography and contended that, from the mid-16th century onwards, the Hungarian theatre of war was one of the earliest, if not the first, battlegrounds where changes in the nature of field warfare amounted to a "revolution" (Dávid–Fodor 2000; Kelenik 2000; Imber 2005). The military engagements of the Long War fundamentally differed from those of the mid-16th century in several crucial respects. This "forgotten frontier" saw not only the widespread application of the artillery fortress (also known as *trace italienne*), but also the massive diffusion of firearms, a marked increase in army size, and experiments with new infantry tactics – all developments hailed as hallmarks of the "European Military Revolution".

Since the Ottoman Empire was militarily the most sophisticated rival of the European powers, its reaction to the "Military Revolution" has also become a matter of scholarly debate in recent years. Until recently, this issue was framed solely in negative terms: simply put, the relative "decline" in Ottoman military power was blamed on either socio-cultural factors (e.g., Islamic values and attitudes that created a reluc-

[1] The themes and points of contention in this debate are reviewed in Black (1991), Eltis (1995), Rogers (1995), Parker (1996) and Black (2004a).

tance to adopt western military innovations) or technological factors (e.g., a failure to update military weaponry and tactics).[2] Thanks to the opening of the Ottoman archives in the 1980s to the international scholarly community and to the growing number of specialists exploiting these archives, an expanding literature on the history of Ottoman warfare has unearthed data that refute the paradigms of "stagnation", "degeneration", and "decline" once advanced to explain developments in the Ottoman imperial system in the post-1580 period.[3]

Instead, the new literature forcefully argues that Ottoman warfare was in no way inferior to European warfare until at least the end of the 17th century.[4] Thus, for instance, Gábor Ágoston's studies prove that, during this period, the Ottomans both kept their artillery technology updated and maintained self-sufficiency in supplying raw materials and ammunition for their ordnance; accordingly, he points to the crucial continuation of military acculturation and diffusion of expertise between the Ottoman Empire and Europe (Ágoston 1996; 2001; 2005a). Similarly, Caroline Finkel and Rhoads Murphey have demonstrated that a highly developed system of logistics and resource management (both human and animal) made the Ottomans successful and effective in power projection, in waging war and in adopting new technologies and tactics (Finkel 1998; Murphey 1999). Indeed, in Murphey's words (1999, p. 106), the Ottoman armed forces "represented one of the most porous and receptive environments for the introduction of new ideas [about military matters]". Scholars in this field now uniformly emphasise that the relative waning of Ottoman military power beginning in the 1680s arose mainly from deterioration in logistical capability and military self-sufficiency during the long-lasting and multi-front wars that resulted from new patterns of diplomacy developed among the European powers (Ágoston 1998; Murphey 1999, p. 9).

Despite all these groundbreaking and meticulous studies, this new historiography is still far from providing a complete and comprehensive account of early modern Ottoman warfare. For instance, current literature provides little data and discussion pertaining to tactical innovations, adoptions and problems in Ottoman warfare during the Long War, even though it was during this period that the Ottomans made crucial tactical changes and overhauled their methods of field warfare in response to developments in European/Habsburg warfare.[5] As several contemporary accounts testify,

[2] For a discussion and critique of the paradigm of Ottoman "military decline", see Ágoston (1999; 2005a, pp. 1–13).

[3] The infamous paradigm of Ottoman "decline" has produced an enormous literature during the last decades. *Inter alia*, see Kafadar (1997–1998) and Hathaway (1996). New approaches to 17th-century Ottoman history can be seen in Faroqhi (1997).

[4] Recent literature on early modern Ottoman warfare is reviewed in Aksan (2002). For a more comprehensive and critical analysis, see Şakul (2003).

[5] Apart from numerous works by Hungarian scholars, the Long War and the details of its military engagements are understudied topics in Ottoman and European historiography. Szalontay (2004) is the most recent contribution to this body of Hungarian scholarship, providing an analysis of engagements based on both Hungarian and Ottoman primary sources. Finkel (1988) remains the only published monograph discussing the Ottoman perspective while Tóth (2000) discusses in detail almost all major military events during the War. See Tóth's bibliography (pp. 458–479), which contains almost 400 titles in Hungarian pertaining to the War. Von Randa (1964) and Niederkorn (1993) both provide crucial details but deal mainly with imperial politics during the War.

the Ottomans experienced serious difficulties in the face of the Habsburgs' positional warfare and new techniques in handling firearms.

This article contributes to the debate on the "Military Revolution" in general, and to the discussion of Ottoman ability to respond to crucial western infantry tactics in particular, by focusing on a single development: the Ottoman use of musketry volley fire during the Long War. It has been generally accepted that the invention and diffusion of musketry volley fire among early modern armies were highly significant and had far-reaching consequences. The invention of this tactic came about in response to a deficiency in muzzle-loading firearms, which were slow to reload. Under ideal conditions, an experienced musketeer in the 16th century could fire one round of shot only every two minutes; the reloading time between shots was long enough to allow the advance of enemy forces. The only effective solution to this problem was to arrange the musketeers in ranks and to "program" them to shoot in sequence so that a constant barrage of fire could be maintained, keeping the enemy at bay (Parker 1996, pp. 18–20). Several European armies began to apply this solution from the late 16th century onwards, so that volley fire had become "the basis for European infantry tactics" in the 17th century, particularly during and after the Thirty Years' War (Townshed 1997, p. 24). In this context, some historians have argued that musketry volley fire was among the military innovations that fundamentally altered early modern European field warfare. In Geoffrey Parker's words (1996, pp. 19–20):

> To begin with, it was now imperative for armies to spread out during battle, both to maximise the effect of outgoing fire and to minimise the target for incoming fire. The battlefields of medieval Europe had often measured only 1 kilometre across, with up to 10,000 men packed into very tight formations; but under volley fire this could be suicidal, and so early modern battles gradually came to be fought by men drawn up in ranks that were as long and thin as possible. This, in turn, had important consequences. First, changing a pike square perhaps fifty deep into a musketry line only ten deep inevitably exposed far more men to the challenge of face-to-face combat calling for superior courage, proficiency and discipline in each individual soldier. Second, it placed great emphasis on the ability of entire tactical units to perform the motions necessary for volley-firing both swiftly and in unison.

Furthermore, since this new firing technique required a high level of drill, discipline, and training, its widespread adoption by European armies was also regarded as one of the factors that "strongly influenced the move towards permanent, standing forces manned by long-service troops" (Townshed 1997, p. 24). This in turn meant an accompanying rise in the size and cost of these new armies. Finally, musketry volley fire was seen as part of the series of "linked changes in the forms of combat that created a serious if not crippling disadvantage to those who failed to adopt it" (Parker 2003, p. 40; 2007).[6]

[6] Geoffrey Parker is publishing a revised and extended version of his 2003 article on volley fire. It is scheduled to appear in the *Journal of Military History* in the spring issue of 2007. I thank him for kindly giving me a copy of his manuscript before publication.

As to the diffusion of this tactic, Geoffrey Parker has provided an examination of the origins and spread of volley fire in Japan and Western Europe. According to Parker (2003, pp. 40–51; 2007), volley fire was invented twice in the 16th century. First, Oda Nobunaga, a Japanese warlord fighting for control of the archipelago, developed the idea of uninterrupted infantry fire by shooting arquebuses in rotating ranks, and successfully used it at the battle of Nagashino in 1575, where Nobunaga's 3000 men in three ranks delivered volleys that proved devastating for the enemy. Thirty years later, and seemingly unrelated to the Japanese case, the Dutch army became the first in Europe to use and perfect this same technique. Parker shows that, thanks to their close reading of works describing Roman military tactics, Counts Willem Lodewjik and Maurice of Nassau came up with the idea of volley fire in 1594, and within six years at most had taught their infantry to practice it in action. In the first two decades of the 17th century, printed works and Dutch-trained instructors taught the armies of other Protestant states to follow suit. Yet, no western army used volley fire *in action* until the 1620s, with the possible exception of the Dutch at the battle of Nieuwpoort in 1600.

Ottoman sources, however, prove that the Janissaries were already using volley fire by 1605, and possibly before. This article introduces, contextualises and analyses a hitherto unnoticed account from a 17th-century Ottoman narrative, the chronicle of Abdülkadir Efendi, which clearly describes the musketeer Janissaries practicing volley fire during the second Ottoman campaign against the Hungarian fortress of Esztergom (Estergon)[7] in 1605.[8] Secondly, it examines an already published but overlooked Ottoman miniature from ca. 1605 which realistically documents the use of this firing technique by the Janissaries in 1597. These two sources together leave no doubt that the Ottomans were able to use volley fire in action by the turn of the 17th century, if not earlier. The remainder of the discussion raises a number of questions about the origin of Janissary volley fire, which currently remains unclear but, in the light of certain Ottoman sources, appears to date to the early 16th century.

The Ottoman sources in question and the Janissaries' use of volley fire during the Long War are highly significant for several reasons. First, considering that European armies used this tactic in action only after the 1620s, the chronicle of Abdülkadir Efendi apparently reports the first recorded battlefield use of volley fire anywhere in central Europe. Similarly, as far as I am aware, the miniature of 1605 is the first

[7] Since the major events referred to in this article took place in Hungary, I use the Hungarian forms of the place-names (except for those for which there is a familiar English name) and give modern Turkish versions in parentheses at first mention. For personal names and quotations in Ottoman Turkish, I follow a simple system of transliteration. All translations and transliterations are mine unless otherwise noted.

[8] Despite the fact that this particular chronicle has been widely used by Ottomanists and the sentences describing volley fire are found in two manuscript versions, historians seem not to have realised the significance of this description. The only exception to this observation, as far as I am aware, is Uzunçarşılı (1943, pp. 375–376). In one of the earliest and most comprehensive studies of the Janissary corps, Uzunçarşılı briefly describes the Janissaries' rank-by-rank firing technique by referring to the same page in Abdülkadir Efendi's account. However, Uzunçarşılı neither calls this technique volley fire nor discusses its significance.

representation depicting volley fire in action anywhere in Europe. Secondly, the use of volley fire by the Ottoman infantry calls for a reconsideration of the accepted pattern for the origins and diffusion of military innovations in the early modern world. Thirdly, this example underlines the importance of the frontier and of "hot war" in providing an environment for inventing, learning, emulating and perfecting new military techniques. Rival commanders were usually the first to observe and experience the consequences of each other's changing battlefield tactics, and they needed to react fast. Hence, this study also raises questions about the assumed superiority of the Habsburgs over the Ottomans during this period and points to the critical continuation of mutual military acculturation between two rivals.[9] Fourthly, as Imber (2005, p. 8) aptly notes, Ottoman sources and a consideration of military engagements during the Long War are both vital "in seeking an answer to the question of whether these new European tactics amounted to a 'revolution' and, if so, when exactly the 'revolution' occurred". Finally, given that many have seen the failure to adopt volley fire as a weakness in the Ottoman army, this example necessarily affects our understanding of early modern Ottoman military organisation and warfare.[10]

I. The Chronicle of Abdülkadir Efendi and Ottoman Volley Fire in 1605

Several contemporary Ottoman narrative sources give detailed descriptions of the battles between the Ottoman and the Habsburg armies during the Long War. One of these is the chronicle of the secretary of the artillery corps, Abdülkadir Efendi, which covers the period between 1592 and 1644.[11] His account is remarkable and crucial in many respects. Given Abdülkadir's expertise in military affairs and his relatively long career in the artillery division, the chronicle constitutes one of the most important narratives of early modern Ottoman warfare.[12] It includes, *inter alia*, several references

[9] For a detailed examination of the channels of military acculturation between the Ottoman and the European armies, see Ágoston (2005a, pp. 15–60; 2005b, pp. 101–133). For a general assessment of the impact of European warfare on Ottoman warfare in this period, see İnalcık (2004, pp. 1065–1073).

[10] For instance, Imber (2002, pp. 281–286), insightfully discusses problems within the Ottoman army in the context of the Long War and notes the lack of volley fire as a crucial flaw.

[11] A critical edition of this work has recently been published (Yılmazer 2003).

[12] Abdülkadir Efendi (d. ca. 1644) was a member of the Ottoman army and held different positions in the artillery division of the Janissary corps. He joined almost all of the major Ottoman campaigns during his career, including the ones during the Long War discussed in this article. Unfortunately, information about his life is very limited. Given that his father was also employed in the artillery corps and that he himself became a secretary in the same corps in 1595, the editor of this work suggests that he might have been born in the 1570s in Istanbul. One passage in the work hints that he and his father were born non-Muslims and recruited by the Ottoman palace. Furthermore, Abdülkadir occasionally mentions his relatives in the artillery units, leading to the conclusion that the family was professionally involved in this particular branch of warfare. For further details on Abdülkadir's life and work, see the introduction by the editor (Yılmazer 2003, pp. XXIII–LXXI). Köhbach (1981) also reproduces the autobiographical sections of Abdülkadir's work.

to actual battle scenes: the preparatory stages of Ottoman campaigns, what kind of ordnance was carried into the field, how much ammunition and other provisions were supplied, discussions within the war councils, novel aspects of field warfare, etc. Furthermore, Ziya Yılmazer, who has recently edited and published this source, notes that the work as a whole does not reveal any connection to any other previous or contemporary work, clearly establishing that the narrative came from Abdülkadir's personal experiences and observations.

Although it is unclear when Abdülkadir started to write his work, Yılmazer notes that all relevant information from the chronicle points to the year 1615, or perhaps even earlier (Yılmazer 2003, p. XXXV). Moreover, Abdülkadir no doubt kept notes to be used at some future time, because all other available contemporary sources corroborate his account insofar as events and dates are concerned. Overall, there are relatively few discrepancies – all of them minor – in his factual information, and the editor's footnotes and crosschecking confirm that Abdülkadir's work is a highly reliable source for this period of Ottoman history.

In Abdülkadir's chronicle, the Ottoman use of volley fire takes place in 1605 at the second siege of Esztergom, when the Ottoman army practiced a field drill in full battle formation on the orders of the grand vizier and commander-in-chief, Lala Mehmed Pasha. On 2 February 1604, Ali Pasha, the first grand vizier serving the newly enthroned thirteen-year-old Sultan Ahmed I (r. 1603–1617), was appointed commander-in-chief and given orders to lead another campaign against the Habsburgs. While on his way to the front with a fully mobilised army, the pasha fell seriously ill and died on 26 July 1604 in Belgrade. The inexperienced young ruler, not knowing whom to appoint as a replacement, asked for advice and, according to Abdülkadir, received a memorandum specifying, "In this present situation, nobody but Vizier Mehmed Pasha has expert knowledge of the affairs of the frontier and will consider the requirements of any matter" (Yılmazer 2003, p. 418). As the army was left without a commander-in-chief at a critical moment, Ahmed I followed this advice and appointed Lala Mehmed Pasha to the office. Mehmed Pasha was indeed very experienced in military affairs, being a vizier as well as a commander who was highly trusted and respected by the soldiers.[13] He is generally considered to have been the most successful Ottoman commander during the Long War (Imber 2002, p. 285).[14]

[13] Abdülkadir (Yılmazer 2003, p. 419) relates that upon receiving news about Mehmed Pasha's appointment as the new grand vizier, the soldiers expressed their excitement: "Our master (*efendimiz*) is our patron who knows every affair. We are rejuvenated again (*yine hayat bulduk*)." This comment may express the troops' wish for an improvement in their fortunes after the terrible defeat by the Habsburgs at Csepel Szigeth (Kovun Adası) in 1603.

[14] For instance, Lala Mehmed Pasha assisted at the capture of Eger (Eğri) (1596); commanded the right wing of the army (the Rumeli troops) at the battle of Mezőkeresztes (Haçova) (1596); served in the army of the grand vizier and commander-in-chief İbrahim Pasha against Érsekújvár (Uyvar) (1599); served at Nagy-kanizsa (Kanije) (1600); was present at the thirty-four-day siege and capture of Székesfehévár (İstolni Belgrad) (1602); and successfully fought against the army of Archduke Matthias near Buda (1603). He also organised the defenses of Buda and the bridges at Eszék (Ösek) (1603), but received a serious wound at the battle of Csepel Szigeth the

On reaching the front, the new commander-in-chief moved against Esztergom. But after a month of bloody siege (mid-September to mid-October of 1604), his army was unable to take the fortress due to the unusually cold weather and retreated to Belgrade. However, it was not only the cold that forced the army to lift the siege. It is equally apparent that the long-range artillery of the enemy, together with the *trace italienne* with which the Habsburgs had encircled Esztergom, rendered the fortress-town unassailable.[15] Abdülkadir relates, for instance, that it was impossible for the Ottoman soldiers either to remain in the trenches or to approach the walls under the intensive and efficient firepower of the enemy artillery (Yılmazer 2003, pp. 420–421).

The following year, Mehmed Pasha was again given overall charge of a campaign against the Habsburgs. The direction of the campaign was not determined beforehand, and in July 1605 a war council gathered near Adony (Cankurtaran) to decide where to attack.[16] According to Abdülkadir, Mehmed Pasha opened the discussion by asking his officers which course of action they preferred: to attack Esztergom again or to raid into Austrian territory. Some council members, mindful of the geo-strategic importance of the fortress, favored an attack on Esztergom, but the Janissaries (Abdülkadir speaks of them as a group) were uneasy with this suggestion and complained about the difficulties of fighting in the trenches; they brought up Esztergom's invulnerability (Yılmazer 2003, p. 436):

> Esztergom is a strong fortress… with [walls] four or five layers [thick]. Its ordnance is very great…. [Moreover] each of its four bastions is a fortress…; the inner fortress is [also] strong and difficult [to assault].[17]

In response to these "realistic" remarks, an elderly cavalryman who had been in the army of Süleyman I (r. 1520–1566) stood up and passionately reminded the gathering that the revered sultan was able to conquer Szigetvár (Zigetvar) in 1566 despite all difficulties and with only 7000 Janissaries, whereas the current army included 20,000 Janissaries.[18] It was their duty, he insisted, to realise Ahmed I's desire for a

---

same year. For further details, see *Encyclopaedia of Islam*, 2nd ed. (hereafter *EI*^{2}), s.v. "Mehmed Pasha, Lala" by de Groot; *Türkiye Diyanet Vakfı İslam Ansiklopedisi* (hereafter *TDVİA*), s.v. "Lala Mehmed Paşa", by Ak; and *İslam Ansiklopedisi*, s.v. "Mehmed Paşa, Lala", by Tekindağ.

[15] See Horváth (2003) for a discussion of *trace italienne* fortresses in Hungary.

[16] The exact location of this council is not certain. Abdülkadir says that the war council gathered in Adony whereas two other chronicles mention that it was either in Eszék or Érd (Hamzabey Palankası). See the note by the editor (Yılmazer 2003, p. 435). Here I follow Abdülkadir's account given that he was present in the army at this time.

[17] The secretary and confidant of Lala Mehmed Pasha, İbrahim Peçevi (Derin–Çabuk 1980, vol. II, p. 301) corroborates Abdülkadir's remarks on the Janissaries' reluctance: "In the previous year, it had proved impossible even to approach the wall of the fortress of Esztergom. Everyone was terrified of its strength and despaired of conquering it." Quoted in Imber (2005, p. 18).

[18] Although such figures in any chronicle should not be taken at face value, 20,000 Janissaries does not seem to be an exaggeration. Recent studies give a total of roughly 40,000 Janissaries in the Ottoman army in the 1600s. See Murphey (1999, p. 45, Table 3.5); and Ágoston (2005a, p. 26, Table 2.1).

resounding victory against the Austrian-Habsburg King – that is to say, they must recapture Esztergom.[19] After this speech, with its emphasis on the strategic importance of the town and the need for a substantial victory, the council decided in favor of an attack and then adjourned (Yılmazer 2003, p. 436).[20]

After the deliberations in the council, Mehmed Pasha issued an order to all units of the army on 23 July 1605. According to our chronicler, Lala Mehmed Pasha commanded all soldiers to go to their regiments with all their weapons and take their positions in order to properly practice how regiments in ranks (*saf alayları*) should be deployed in a battle and how the order of march (*yürüyüş kā'idesi*) should be executed in an attack against the enemy.[21] The order further specified the need to "make the soldiers know the rules [of action] when the right and left wings under the command of the governor-generals and governors move all together against the infidels" (Yılmazer 2003, p. 437). It also commanded a musketry drill: "And let the infantry Janissaries (*piyâde yeniçeri*) drill so as to learn how to form ranks behind the cannons in a field battle (*alay cengi*), and how to reload their muskets; afterwards let every regiment in ranks practice the [actual order of] engagement and battle." The final words of the order reveal that Mehmed Pasha also wanted to use "psychological warfare" by making – literally – a show that would reveal Ottoman power to the enemy and encourage them to surrender without a bloody engagement. The last sentence reads "[In this way], both the cavalry and the infantry soldiers will be known and the enemy spies will take the warning" (Yılmazer 2003, p. 437).[22] Given its timing, it is clear that Mehmed Pasha's order aimed to fully prepare and coordinate his troops for the recapture of Esztergom.

Following Mehmed Pasha's order, every cavalry and infantry unit (drawn up on the right and left wings) took its position in the field and prepared for the drill. Following this, we find the first reference to Ottoman volley fire. (Note the change in

[19] The chronicler Mustafa Safi, Ahmed I's personal prayer leader and advisor, asserts that Ahmed I wanted Esztergom recaptured. When Ahmed I and Lala Mehmed Pasha met in Istanbul in February 1605, he maintains, they discussed the ongoing war in Hungary. According to Safi (Çuhadar 2003, p. 9), "It was made clear [to Mehmed Pasha] that the conquest of Esztergom was the most important purpose of the sultan". However, as mentioned above, there was no clear target of the campaign until Mehmed Pasha gathered all the forces in Hungary.

[20] The strategic importance of the town was proved by further surrenders produced by its fall: Veszprém (Vesprim/Pesprim), Vár-Palota (Polata) and Érsekújvár. For a discussion of the strategic importance of fortresses in Hungary during this period, see Ivanics (2002).

[21] Judging from the tone of his chronicle, Abdülkadir actually read this order, which was probably written and sent to each regiment in the army. We know that the Ottoman chroniclers of this era gathered various official documents and inserted them in their narratives; they were mostly bureaucrats in different posts and had access to such correspondence. According to Yılmazer, Abdülkadir appears to have relied occasionally on such texts. See Yılmazer (2003, p. XLII).

[22] There is currently no information about whether this drill was ever observed by the enemy spies (who must have been around) or how it was perceived by the Habsburgs, but Esztergom did not surrender as a result of Mehmed Pasha's display of power. It did so only after a thirty-five-day siege and on terms (3 October 1605). The terms of surrender concerned the safe conduct of the soldiers and townsfolk whose number is estimated around 5400. See note by the editor (Yılmazer 2003, p. 442).

the middle of the passage from past to present tense. Abdülkadir appears to have actually observed the drill.)

> And in the middle of the field, the Janissary regiments stood in three ranks, each musketeer with matches ready [to fire], and they lined up the big cannons chained in front of the Janissaries. Then, after the first rank of the Janissaries fires their muskets, the second rank fires, too. Afterwards, the rank that fired first bends double and begins to reload their muskets. And as the third rank fires, the second rank in front [of them] bends and prepares their muskets. Then, the first rank again stands up and fires their muskets (Yılmazer 2003, p. 437).[23]

Abdülkadir here unequivocally describes volley fire by the musketeer Janissaries: they line up in three ranks behind the cannons and take turns firing and reloading their arms. In order to prepare their muskets, they kneel following their turns. They seem to have adopted this drill not only to allow the back ranks to shoot, but also to take shelter while reloading their muskets under fire from the approaching enemy. It is certain that the muskets were matchlocks, the most popular firearms at this time, since Abdülkadir says "matches ready" (i.e., lit.).[24] Similarly, since the account mentions that the first rank fired a second volley, it is evident that the rotation continued.

Unfortunately, Abdülkadir's description is too brief to allow speculation on how many Janissaries stood in each rank, the total number of rotations by the three ranks, who commanded them, etc. Yet, it reveals that the Janissaries used this tactic without making a major change in their traditional battle formation.[25] They had previously fought in ranks, and the Ottomans always placed the elite infantry corps in the center of the army, standing in front of the sultan and/or the high-ranking vizier-commanders and behind the chained cannons (known as the fortified Ottoman *Wagenburg*). Hence, the Ottoman army appears to have ingeniously incorporated a new tactic into its *Wagenburg* to be carried out by the musketeer Janissary regiments alongside the artillery and other infantry units. As discussed below, this is not surprising at all, given that the Janissaries were one of the most disciplined forces in the

[23] "*Ve meydân ortasında yeniçeri üç kat saf durup, tüfeng-endâz her biri fitilleri hâzır ve şâhî darbuzanlar yeniçerinin önlerinde zencîrlenüp, dizdiler. Bâ'dehû yeniçerinin evvelki safı tüfenglerin atduklarında, ikinci saf dahi atup, bâ'dehû evvel atan saf iki kat olup, tüfenglerin doldurmağa mübâşeret üzere olurlar. Ve saff-ı sâlis atduklarında, ilerüde saff-ı sânî eğilür, tüfenglerin hâzır ederler. Bâ'dehû evvelki saf tekrâr kalkup, tüfenglerin atarlar.*" The phrase *iki kat olmak*, used by Abdülkadir to describe the actions of the soldiers in the first rank while reloading their muskets, means "to bend double". In this context, however, it should mean, "to kneel" given that he then says, "they stood up".

[24] For the details of Janissary muskets, see Ágoston (2005a, pp. 88–93). Ágoston also notes that it was during Murad III's reign (r. 1574–1595) that all the Janissaries were equipped with matchlock muskets.

[25] See Parry (1975), Finkel – Ágoston (1997) and Tacan (1936) for the traditional battle formation and tactics of the Ottoman army. I thank Nedret Emin İşli for providing me a copy of the latter work.

early modern world and that they had been accustomed to fire rank by rank since at least the early 1520s. However, given that the above example of volley fire takes place during a drill, the questions of whether the Ottomans actually used the tactic in action and how much of Abdülkadir's account is supported and/or detailed by other sources both remain to be answered.

II. Nakşi's Miniature and Janissary Volley Fire in 1597

Fortunately, we have an Ottoman miniature which not only complements Abdülkadir's description by providing details lacking in his narrative but also proves that the Janissaries were using this tactic in actual military engagements. The image in question is the last of eight miniatures illustrating the work of Ganizade Mehmed, who wrote under the pen-name Nadiri.[26] This unpublished manuscript is the only illustrated collection of Nadiri's poems, which has been dated to ca. 1605 by art historians.[27] It includes eulogistic poems for Sultans Murad III (r. 1574–1595), Mehmed III (r. 1595–1603) and Ahmed I as well as for some high-ranking viziers and members of the royal court under these sultans, which extol these personalities for their patronage, virtues, and characters.[28] In his introduction, Nadiri says that the work was compiled on the suggestion of Ali Agha, the master of the imperial stables, with whose help the manuscript was presented to the royal court. Ali Agha was the brother-in-law of Gazanfer Agha, the chief white eunuch of the palace and a prominent patron of the arts. Nadiri was a protégé of Ali and Gazanfer Aghas, for whom he wrote his most lavish poems. The miniatures in his manuscript were all painted by Nakşi, who is well known for introducing a new style of realistic painting and perspective within the context of the early 17th-century Ottoman art.[29] As noted by scholars, this court artist had an exceptional talent to "transform words into images" when illustrating such manuscripts. As a painter, Nakşi was surely informed and/or had some intimate knowledge of the events and personalities mentioned in Nadiri's poems; his miniatures not only depict them very realistically, but also include several extra details that are similarly provided by other sources. Overall, Nadiri's poems do not reveal any information about the event depicted in the miniature, nor do they provide any specific information about the Janissaries' firing technique, except for one poem seemly

[26] *Divân-ı Nâdirî*, Topkapı Palace Museum Library (TSMK), MS H. 889, fol. 26b. It should be noted that this miniature has already been published in Tanındı (2003, p. 144). Yet Tanındı neither discusses the significance of this miniature in terms of volley fire nor, as shown below, identifies the scene correctly. I came across this miniature during my research in the Topkapı Palace Museum Library without prior knowledge of its publication. I thank Zeynep Çelik, the Curator of Manuscripts at the TSMK, for informing me about this article and giving me a copy of it.

[27] It is certain that the miniatures were finished after 1603 and before 1606. For details of its dating, see Tanındı (2003, p. 145), and Fetvacı (2005, pp. 287–290).

[28] A critical edition of Nadiri's poems has been published by Külekçi (1985). For Nadiri's life, see Külekçi's introduction, pp. 5–15.

[29] See Ünver (1949, pp. 23–39), and Tanındı (1996, pp. 55–57), for details of Nakşî's life and works.

associated with this miniature which acclaims the Ottoman musketeers for shooting bullets like "gliding stars" against the enemy (*Dîvân-ı Nâdirî*, fol. 26a). Yet, Nakşi's miniature does untangle several crucial problems.

It should first be noted that this miniature depicts a scene that actually took place but that was incorrectly identified by scholars (Tanındı 2003, p. 145). It has heretofore been assumed to depict the battle of Nicopolis (Niğbolu) in 1598 between the forces of the commander Hadım Hafız Ahmed Pasha, the governor of Bosnia (here depicted on horseback among the Janissaries) and those of Mihai Viteazul (also known as Michael the Brave), the rebellious Voyvoda of Wallachia in the 1590s. It is known that both Gazanfer and Ali Aghas, paying all expenses from their own pockets, had sent a force of 100 musketeers and 50 armor-clad infantry soldiers to aid Ahmed Pasha in October 1598 (İpşirli 1999, p. 774). Nadiri's poems praise these two aghas for their generosity in this regard and it seems that this miniature, though indirectly, emphasises this benevolent act.

However, a detail in the miniature actually allows a more precise and correct dating of the event depicted. The figure wearing the tiger-skin among the European soldiers can be identified in contemporary Ottoman chronicles as the commander of a Transylvanian mercenary force sent by Mihai in 1597. According to Selaniki, a contemporary chronicler and bureaucrat who seemingly had access to the reports sent by Ahmed Pasha following the engagement, the Transylvanian soldiers numbered 1000, among which 300 were given the mission of laying an ambush in the mountain passes near Nicopolis for the Ottoman forces marching to join the campaign. Selaniki gives this mercenary commander's name as Herseklü (literarily, "from Herzegovina") and mentions that Ahmed Pasha, who had previously been ordered to secure the passages along the Danube around Vidin, captured him and a few of his forces alive after a coordinated attack with the Ottoman cavalry forces. Selaniki writes, "[T]heir commander, Herseklü, with his tiger-skin, was captured alive…and he was sent to Istanbul with 700 severed heads" (İpşirli 1999, p. 733). The prisoner, together with the heads and reports and letters sent by Ahmed Pasha, arrived in Istanbul on 7 April 1598 (İpşirli 1999, p. 733). Abdülkadir Efendi, on the other hand, puts this engagement in mid-November/early-December of 1597 in the mountain pass near Nicopolis (Yılmazer 2003, p. 205).[30] These accounts thus show that the scene depicted in the miniature took place in 1597, not in 1598.[31] It should also be mentioned that, soon after this engagement, Mihai arrived with his army and fought against Ahmed Pasha once again in the vicinity of Nicopolis. During this battle, according to Abdülkadir, Ahmed Pasha and his forces at first suffered some setbacks, but in the end they managed to defeat the forces of Mihai, who fled the scene (Yılmazer 2003, p. 205). Nakşi seems to have depicted Ahmed Pasha's victories over both Herseklü and Mihai on a single

[30] The date given according to the Hijri calendar in the original text is Rebî'ulâhır (1006), which corresponds to 11 November to 9 December 1597 in the Gregorian calendar.

[31] Nakşi, as a person close to the royal court, would have heard of Ahmed Pasha's success and may even have observed the prisoner's entry into Istanbul.

page; here, Mihai is probably the figure in the black cape and hat approaching from behind the hill with his army.

Although contemporary narrative sources on this engagement are silent regarding the firing technique of the Janissaries, Nakşi's miniature shows that the Ottoman infantry was deployed in three well-ordered, consecutive ranks, of which the first one is firing and the second one is loading. We note that the first Janissary on the left is pouring powder down the muzzle of his barrel, the one at the other end is inserting a bullet and the one in the middle appears to have completed these tasks and is shouldering his gun. The third rank in the meantime has arms shouldered, obviously awaiting their turn. It is absolutely certain that the Janissaries were firing volleys in action here. In one sense, Nakşi's miniature is a visualisation of Abdülkadir's narrative depicting the choreography of the rank soldiers in fire-and-reload action.[32] Thus, it is clear that, just as in Abdülkadir's description, the first rank here would also have reloaded after charging, and the second and third ranks would have followed suit, creating the overall effect of uninterrupted fire. It appears that it was either Ahmed Pasha or the Janissary commander, depicted right behind him, who directed the Janissaries' action here.[33] Furthermore, the artist portrays the European mercenaries and their deployment in the field quite realistically. They appear to be deployed in only two ranks, but in a much less disciplined manner than the Janissaries' highly regular three ranks. Yet they do not seem to execute any special tactic. (See Image 1 on p. 420.)

Nakşi depicts in elaborate detail the stages of loading, the three-rank rotation, and the firing sequence of the Janissaries, as well as the location of this episode and the actors involved in it. He is obviously well informed about this tactic and about the engagement in question. He must certainly have seen the Janissaries firing in this manner sometime before 1605; otherwise, he would not be able to replicate such a complicated set of actions. Unfortunately, information on Nakşi's life is so limited that we cannot determine with certainty whether he was present with Ahmed Pasha in 1597 or had observed Ottoman volley fire before or after that date.[34] Most likely, he was an eye-witness to earlier military engagements involving Janissary volley fire.

[32] Given the conventions of Ottoman miniature painting and the limited space available to him, the artist seems to have been able to depict only four or five Janissaries in each rank. This number would be much higher in real battle conditions.

[33] It is known that the Ottomans used their military band (*mehter*), among other purposes, to coordinate and communicate with the units in action. For instance, writing about a battle in 1521 in Damascus, Matrakçı Nasûh, *Süleymânnâme*, TSMK, MS R. 1286, fol. 30b, mentions that the Janissaries in the *Wagenburg* fired their weapons after the drums played: "*yeniçerînün tüfeng-endâz ser-bâzları safflar bağlayup ve top arabaların ki dîvâr-ı hisâr-ı revândı önlerine dutup ol sedd-i üstüvârla cûy-bâr-ı hayl-i seyl-reftâr-ı adû-yı bâr-pûy u fesâd-cûyın önin bağladılar. Kûs-ı harb-ı ra'd-vâr görilüp tîğ-i mîğ-i berk-girdâr şakıyup tüfeng-i saffşiken dolu gibi yağup…*" (Transliteration is by Erkan 2005, p. 25.) Note that a band is also depicted here in the background, suggesting that it is similarly signaling to the Janissaries to fire.

[34] Nakşi became a famous painter in the late 16th century. Apart from extolling him as an exceptionally talented artist, Ottoman biographical sources also note that he was from Istanbul and, because of his impressive erudition on astronomy and astrology, he was later appointed as a timekeeper (*muvakkit*) at the imperial mosque of Süleyman I. However, there are no certain dates provided on this appointment. For these partial biographical data, see Ünver (1949, pp. 23–26).

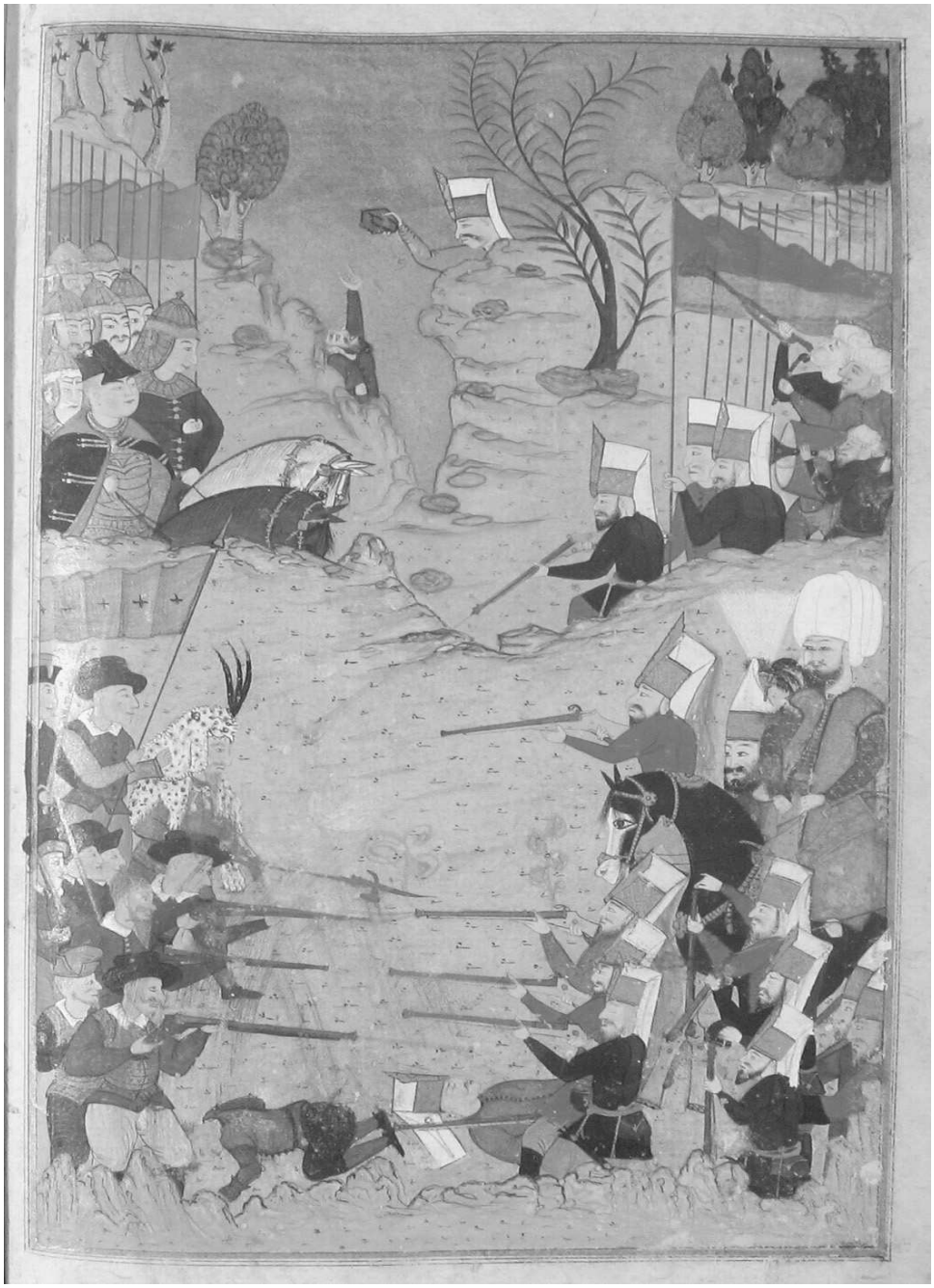

Image 1. *Divân-ı Nâdirî*, TSMK, MS. H. 889, fol. 26b

From Abdülkadir's and Nakşi's depictions, as well as from our knowledge of contemporary volley fire, we can safely assert that the Janissaries were trained in volley fire before executing this maneuver during the Long War. First, Abdülkadir's account does not mention that they had any problem in rotating or shooting or, for that matter, that there was any confusion at all. Similarly, the Janissary ranks in Nakşi's miniature are shooting and loading in a very disciplined manner. Secondly, maintaining volley fire was not an easy task for any soldier at this time and the only way to make it work, especially under fire, was practice (Parker 1996, pp. 17–24; 2007). Thus, it is clear that, just as it was necessary for European soldiers to drill under supervision, so it was essential for the musketeer Janissaries to train with arms and tactics long before being deployed for action. The key questions, then, are whether there is any evidence of such prior training and when the Ottomans learned and used volley fire for the first time.

III. Drill and Tactics

As is well known, the strict discipline of the Janissaries was frequently mentioned by contemporary eyewitnesses, and they had developed one of the most effective methods of training and drill in firearms and other weaponry, as well as in tactics, long before the Long War.[35] Lazarus von Schwendi, the author of *Kriegs Diskurs* and the commander of the Habsburg army in Hungary between 1564 and 1568, for instance, noted the extraordinary marksmanship, effective tactics and fatal firepower of the Janissaries (Parry 1975, pp. 223–227; Ágoston 2005a, p. 25). Similarly, the imperial ambassador to Süleyman I between 1554 and 1562, Ogier Ghiselin de Busbecq, was often impressed by the organisation and discipline of the Ottoman army. In one of his letters, he noted Ottoman soldiers' skills in using firearms "which they acquired by long practice in warfare and continual exercise" (Foster 1967, p. 146). The Janissaries' impressive firing capability and discipline also stemmed from the fact that they "had grown accustomed to each other in the schools, were trained uniformly, and lived together for long years" (Perjés 1989).[36] This comradeship among the Ottoman soldiers would have enabled them to adopt new tactics swiftly. Another factor, as seen above, was the Ottoman army's habit of performing drills in full formation so as to simulate battle conditions, synchronise the units' actions and sharpen their firing techniques before they engaged in combat. For instance, Baron Wenceslas Wratislaw, who

[35] Our knowledge of Janissary tactics and training is still very limited. Murphey (1999) and Ágoston (2005a) are the most recent contributions in this respect. Káldy-Nagy (1979) is among the few earlier studies to include a discussion of Janissary tactics. The laws and regulations of the corps and the duties, responsibilities and formation of the Janissaries have been so far found in only a few codified forms. One example dating from ca. 1606 is published. See Akgündüz (1996, pp. 133–168, 235–237 and 266) on recruitment and training. For a general discussion of the Janissaries, see Uzunçarşılı (1943) and *EI*^{2}, s.v. "Yeñi Čeri", by Murphey.

[36] At the time of writing, I had not been able to consult a hard copy of this work. Thus, I use an online edition at http://www.hungarian-history.hu/lib/warso/warso04.htm.

was with the Ottoman army marching against Eger under Mehmed III in 1596, observed such a drill (Wratislaw 1862, p. 198):

> When the Turkish Emperor moved from his place with his whole army, and began to march towards Erlau, they formed, in a very beautiful plain, opposing armies of camels, mules, and horses, amounting to full 150,000 in number, and so extensive that it was impossible to see the end of them; they drew up as though they were about to engage in battle, fired cannons and all their heavy artillery at each other, surrounded the body which represented the Christians, skirmished, turned it to flight, took many thousand prisoners, and flattered their Emperor, giving him good hopes of victory….[37]

The Janissaries surely formed an effective unit in the central array of the Ottoman army, particularly during the 16th century, when the increasing use of firearms in battle made musketeers a critical force, together with the artillery. Péter Pécsi Kis, a mid-16th-century Hungarian author who had the chance to personally examine and learn various aspects of contemporary Ottoman warfare, insightfully noted that the Janissaries not only handled their "long barreled light arquebuses" in a masterly manner; they also played such a critical military role that they often affected the outcomes of engagements (Szalontay 2004, p. 142). For this reason, Pécsi Kis advised his fellow Christians that the Janissaries "armed with arquebuses should somehow be overcome since all 'Turkish military hope' rested upon them" (quoted in Szalontay 2004, p. 143). He was quite right. For instance, it was the Janissaries' firepower, rather than the Ottoman cannons, that decided the fate of many Hungarian soldiers at the battle of Mohács in 1526 (Ágoston 2005a, p. 24).

During the Long War, however, the number of musket-bearing Ottoman soldiers in the regiments expanded. The Ottoman government attempted to counterbalance the numerical superiority of the Habsburg army, first by increasing the number of musket-bearing Janissaries, and then by establishing formations of rifle-bearing infantry, generally known as *sekban*s (Ágoston 2005a, pp. 26–28). These soldiers were generally employed as garrison guards and their number by 1596 had risen to 20,000 (Finkel 1988, pp. 36–46).[38] *Recruiting* musketeers was relatively straightforward: it took only a few hours to learn how to use a simple musket. But mastering the art of firing the gun effectively in battle formation required weeks of training. This was evidently understood by the Ottomans; thus the Janissaries continued to drill regularly as before, but apparently with new objectives and newly recruited comrades. For instance, in Istanbul in January 1594, on the orders of Sultan Murad III, "the Agha of the Janissaries went to [the drill-field at] Ok-meydanı, and the [Janissary] comrades started to drill and fire their muskets, while those inexperienced comrades, according to the law, came to the field for training" (İpşirli 1999, p. 355). After three months of

[37] Also see Derin–Çabuk (1980, vol. II, p. 69), and Zeyrek (2001, p. 25), for examples of Ottoman drills during the Ottoman–Safavid conflict of 1578–1590.

[38] For a discussion of the broader repercussions of these changes in Ottoman military organisation, see İnalcık (1975; 1980).

drilling and training, these elite soldiers were deployed to Hungary in April 1594 (İpşirli 1999, p. 365). Similarly, there were 3000 young, newly recruited Janissary musketeers in the army of 1595, which marched to Hungary under the command of Grand Vizier Ferhad Pasha. According to Abdülkadir, Ferhad Pasha kept a constant eye on these units, inspecting the soldiers and their use of weapons at every stop (Yılmazer 2003, p. 59).

In this context, Abdülkadir notes another drill. When the Ottoman forces were gathered near Adony in June 1594, this time under the command of the Grand Vizier Koca Sinan Pasha, the army was ordered to "practice the moves in battle style (*ceng üslûbu*)", in which "the Janissaries formed three ranks" and fired behind the chained cannons (Yılmazer 2003, pp. 33–34). Months before the battle of Mezőkeresztes in 1596, the Janissaries in Istanbul were regularly drilling in the fields twice a week (Yılmazer 2003, p. 111). Similarly, in 1599, the Janissaries were practicing with muskets "at all times" in the capital (Yılmazer 2003, p. 237). In 1604,

> the officers were always given orders [to come] with their soldiers opposite the drill-field at Et-Meydânı, and three times a week the Agha of the Janissaries used to come, and [under supervision], the Janissaries used to practice with muskets. They put up targets [and] the Janissary comrades with their officers formed ranks and drilled to learn the science (*'ilm*) of the musket (Yılmazer 2003, p. 401).[39]

Abdülkadir also records repeated attempts by the Ottoman government to mobilise as many musket-bearing soldiers as possible for deployment in the Hungarian theatre and on other fronts.[40] In 1595, for example, he quotes an order of the Grand Vizier Ferhad Pasha demanding that all Janissaries assigned to the imperial campaign be immediately deployed to Transylvania and Hungary (Yılmazer 2003, p. 59). In 1605, he writes:

> The Agha of the Janissaries, Hüseyn Ağa, upon the orders [of the grand vizier], used to go to the [drill] field twice a week [and] the officers used to gather their soldiers, drilling them in the use of muskets. And sergeants were also sent to Rumeli and Anatolia in order to drive the Janissaries to [Istanbul] (Yılmazer 2003, p. 480).[41]

[39] The Arabic term *'ilm* has multiple connotations in Ottoman parlance. It literally means science, knowledge, learning, theoretical knowledge, dexterity or skill. In this example, it seems to refer to both theoretical and practical knowledge of how to use a musket; thus I prefer to translate it as "science".

[40] The Ottoman forces were more or less concurrently fighting on three fronts during these decades, namely in the East against the Safavids, in Hungary against the Habsburgs and in Anatolia against the Celali rebels.

[41] See examples on 190, 549, 837, 1049 and 1092. In this context, Ágoston (2005a, pp. 24–25) notes that "[A]t least before the major campaigns, the Janissaries did practice with their muskets. Istanbul also urged the provincial governors to continue the shooting practices and to examine thoroughly the shooting skills of all the Janissaries serving in their respective provinces."

In sum, since the Long War dictated increased numbers of soldiers with firearms, more Janissaries gathered in Istanbul and other cities to prepare for the new-style combat. Taken together, these accounts show that when Ottoman soldiers trained in Istanbul before deploying to the battlefields and drilled in full formation before actual engagements, they received instruction in various tactics and practiced them regularly. Although as yet we lack further information on the details of these drills, numerous passages in late 16th- and early 17th-century Ottoman narratives depict the Janissaries in field battles as fighting and firing in three consecutive ranks, usually behind the chained cannons, just as Abdülkadir describes.[42] It is clear that the Janissaries were "programmed" to fight and fire within three consecutive ranks and that this was their long-established battle order and tactic in the field.[43] Hence, certain Janissary musketeer units must have been receiving advance training in the tactic of volley fire during this period so that they were able to use it in action.

IV. The Problem of Origins: Battles, Innovations and Emulations in the Hungarian Theatre of War

When war broke out in 1593, the Ottoman and Habsburg imperial armies had not engaged on the field since the last Hungarian campaign of Süleyman I in 1566. In the meantime, the Habsburgs had enhanced their defenses in Hungary by adopting the *trace italienne*, employing the most recent weaponry and infantry tactics, and increasing their army size. As noted earlier, such critical and comprehensive developments have led some scholars to argue that the Hungarian theatre of war was one of the earliest battlegrounds where the so-called European Military Revolution took place. On the other side, the Ottomans' most recent engagements had been against the Safavids, who were relatively weak in artillery. However, these campaigns, which secured new territories in the Caucasus and Azerbaijan between 1578 and 1590, proved that the Ottomans could maintain an army in the field for over a decade, supporting the contention that their military prowess was as great as before.

Recent research confirms that although the Ottomans unexpectedly emerged victorious at Mezőkeresztes, the single major field-battle of the Long War, this and other military engagements between the Habsburgs and the Ottomans during the Long War did indeed expose some weaknesses of the latter, particularly within the infantry units (Ágoston 1998, p. 135).[44] A statistical study by the Hungarian historian László

[42] See, for instance, Yılmazer (2003, pp. 23, 33–34, 136, 143, 145, 162, 173, 201, 245, 282 and passim.); Zeyrek (2001, pp. 25 and 68); Kirişcioğlu (2001, pp. 18, 32, 35, 38, 49, 66, and passim.); and Çerci (2000, volume III, p. 407). All these examples are from ca. 1580–1610. The only notable exception to the three-rank formation is at the battle of Mohács in 1526, where the Janissaries formed nine consecutive ranks. For a discussion of these details, see below.

[43] For instance, narrating Özdemiroğlu Osman Pasha's battle with the Safavid army in 1583, Gelibolulu Mustafa Ali (Çerci 2000, volume III, pp. 407–408), mentions that the musketeer Janissaries were lined up in three ranks behind the cannons and that they fired constantly at the enemy.

[44] For the details of this battle, see Schmidt (1985) and Finkel (1988).

Nagy reveals that sixty-three of the eighty-three engagements between the two rivals ended in Ottoman defeats – though most of these were small-scale skirmishes that did not uproot the Ottoman presence in Hungary (Nagy 1982–1984, p. 680, cited in Szalontay 2004, p. 150, n. 39).

But the Ottomans were quick to notice these problems. After the Eger campaign, for instance, Hasan Kafi Akhisari, a Bosnian scholar, submitted to Sultan Mehmed III and his commanders a treatise on the political and military problems he had recently observed. According to Akhisari, one reason why the enemy prevailed over the Ottomans was that "they use[d] certain… new hand and field guns that our soldiery fail[ed] to apply" (quoted in Fodor 1986, p. 226).[45] Having personally witnessed the battle of Mezőkeresztes, Akhisari no doubt referred to the superior firepower of the Habsburg infantry units. Similarly, in ca. 1603, Lala Mehmed Pasha, then one of the commanders serving in the Hungarian theatre, noted in a memorandum to the Grand Vizier Yemişçi Hasan Pasha, "Most of the soldiers of the accursed ones are on foot and are musketeers. Most of the soldiers of Islam are horsemen, and not only are infantrymen few, but experts in the use of the muskets are rare. For this reason, there is great trouble in battles and sieges… so, the musketeer Janissaries, under their *agha*, must join the [sultan's] army promptly" (Orhonlu 1970, pp. 71–72).[46]

Between 1593 and 1606, the Ottoman army fought against numerically superior imperial regiments within which, compared to the numbers of pikemen, the proportion of infantry soldiers carrying firearms increased, in some units amounting to seventy-five percent. Moreover, the infantry units of the Habsburg army fighting in Hungary, which were similar to those deployed in Flanders, were composed of different groups of soldiers (e.g., "Walloons", "Frenchmen", "Hungarians", and "Germans") (Kelenik 2000, pp. 130–137).[47] As noted earlier, the first Ottoman reaction to these developments was to follow suit by increasing the number of musket-bearing soldiers in the Ottoman army. However, since the very first years of the War, the enlarged groups of Habsburg musketeers on the battlefield and their entrenched positions amid increased artillery fire posed a more serious challenge.[48] Cafer Iyani, another Ottoman author who joined the Long War in its early stages, frequently mentions this new Habsburg threat. According to Iyani (Kirişcioğlu 2001, p. 24), at the battle of Sziszek in June 1593 (in which the Ottomans were badly defeated),

[45] The same observation is quoted from an older German translation by Parry (1975, p. 228).

[46] Also quoted in English by İnalcık (1980, p. 288; 1975, p. 199).

[47] Just before the battle of Mezőkeresztes, Peçevi notes the unprecedented size of the Habsburg army, which had "… a limitless number of troops, an enemy without bounds… advancing rank on rank". The official reports on the Habsburg troops also mention the same point: "…all the kings and dukes of the infidels had, by agreement, collected such an army that this many troops had never before assembled". Both quoted in Imber (2005, p. 11).

[48] The Ottoman army was still relatively successful in laying sieges and capturing *trace italienne* fortresses, as the examples of Győr (Yanık/Yanıkkale) in 1594, Eger in 1596, Kanizsa in 1600 and Esztergom in 1605 proved. See Szalontay (2004, pp. 152–170) for a discussion of the role of weapons and tactics utilised by the two sides during the Long War.

> [t]he treacherous infidels also formed ranks in five places. When German *fegveroş* soldiers, each one with five or six muskets [ready] nearby and in front, and dressed in full steel [armor], stood against and engaged with the soldiers of Islam, they delivered thunder-sounding… cannons. Between the two sides, there happened such a battle and killing… that it is beyond [any] stating and recording.[49]

Another contemporary Ottoman chronicler, Mehmed bin Mehmed, similarly mentions that, at the engagements near Vác (Vaç) in 1597 and Kanizsa in 1599, the simultaneous fire of the Habsburg cannons and musketeers from their entrenched positions caused severe casualties among the Ottoman soldiers who were either attacking or pursuing the enemy (Sağırlı 2000, pp. 284 and 517, respectively). Later, in describing an engagement between the two sides in 1601 during which he witnessed intensive fire, Abdülkadir writes, "The infantry of the infidels… fired grape shot (*saçma*) and bullets as if they were rain" (Yılmazer 2003, p. 315).[50]

The testimony of contemporary European sources also reveals that the Habsburgs employed new army formations along with various combinations of up-to-date tactics against their rivals. For instance, describing the imperial army in 1596 under Giorgio Basta, an Italian soldier and military writer who commanded the army of Rudolf II against the Ottomans in later years, as well, Richard Knolles writes (1603, p. 1125):

> The bodie of his maine battell consisted of one great squadron of about three thousand Almaine footmen, flanked on each side with a hundred & fiftie Rutters of SILESIA: before the squadron toward the right hand he had set a loose wing of three hundred musketiers: in the right wing towards the hill he placed a companie of launces, with two squadrons of the countrey footmen: and in the left wing toward the riuer one squadron of Transylvanian footmen, and two of launces, for that the enemie was at that time very strong in horsemen: the Cossackes, archers, and harquebusiers he placed in the reward: of his great artillerie he would make no use, for that having not much, he would not stand upon the defence thereof, but desired rather with all speed to come to the sword with the enemie, unacquainted with such close fight, foot to foot; and well the lesse fit, by reason of their light armour. And therfore he thought it best first to set forward his squadron of Almaines to give the charge, bending towards the right hand, amongst the thickest of the footmen towards the artillerie at the foot of the hill, as there whereas was the strength of the enemies infanterie.

[49] The term "fegveroş" is Hungarian loan word from "fegyveres" which means an armed man (Szalontay 2004, p. 159, n. 58).

[50] Also see the examples in Yılmazer (2003, pp. 85, 157, 232, 284, 286); Derin – Çabuk (1980, volume II, pp. 271 – 273); and Imber (2005, pp. 15 – 17).

Some historians have argued that, within such formations, firing in salvoes was a new tactic of the Habsburg infantry in Hungary during the Long War. According to Vernon J. Parry, Basta was the mastermind behind a new set of military tactics.[51] After observing the strength and effective tactics of the Ottoman forces (including the cavalry units of the Crimean Tatars) during the Long War, Basta published his ideas in 1606 in a book entitled *Il maestro di campo generale*. The gist of his plan, as seen in the above quotation, rested on close coordination between the infantry and cavalry, and among the pike, musket and lance corps, as well as on the endurance of the troops and effective firepower by the infantry (also see Parry 1975, pp. 228–232). In order to repulse Ottoman cavalry attacks, he believed that the musketeers, under the protection of the pikes, should fire their guns "in più salve" ("in many salvoes") and at relatively close range (Parry 1975, p. 230). According to Parry, "the tactical system that Basta devised for warfare against the Turks and the Tatars constituted a notable and – with allowance made for earlier 'formulae' – even an original advance over the methods hitherto in vogue on the Hungarian front" (Parry 1975, p. 232). Basta's ideas were no doubt a novelty within the context of late 16th-century Habsburg field warfare in Hungary.[52] It seems almost certain that he is referring in his work to infantry volley fire. However, as far as I am aware, there is currently no clear evidence ass to when the Habsburgs employed volley fire for the first time against the Ottomans between 1596 and 1605.[53] Basta had previously fought in the Netherlands under Alessandro Farnese, Duke of Parma, and during the Long War, the Habsburg troops included many veterans of the Army of Flanders. Hence, given that Basta's book was published in 1606, a period when there was much discussion of alternative warfare tactics in Europe, Habsburg commanders could easily have seen and/or heard of the Nassau "evolutiones" and in the meantime gotten the idea from the Dutch.[54]

In any case, in order to respond to such new techniques of Habsburg field warfare, the Ottoman army, particularly under Lala Mehmed Pasha, adopted several tactics

[51] On Basta's career, see *Dizionario Biografico degli Italiani*, s.v. "Basta" by De Caro.

[52] In the 1580s, the Spanish Habsburgs were already developing ideas on how to increase the rate and efficiency of infantry fire. For instance, Lieutenant Martín de Eguiluz, a veteran of the Army of Flanders, in his *Milicia, discurso y regla militar* (1586), describes a new maneuver which closely resembles volley fire. However, de Eguiluz's formulation, which predates Nassaus' similar ideas by eight years, essentially refers to a tactic to be employed by the *tercios* in skirmishes (*escaramuzó*) against cavalry attacks, as opposed to one to be adopted by the whole army in field warfare. See Andújar del Castillo (2000, pp. 189–191). Hence, Basta could have taken, improved and used such new ideas regarding infantry tactics within the milieu of the Habsburg–Ottoman conflict. For a discussion of de Eguiluz's and other Spanish writers' ideas, see Parker (2003, pp. 48–52), and De León (2004, pp. 25–42).

[53] For instance, Szalontay, in *The Art of War*, while discussing the battlefield tactics of the Habsburgs during the Long War, does not mention any incident of Habsburg volley fire. Kelenik (2000, pp. 130, 155 and 158), on the other hand, suggests that volley fire was among the tactics of the Habsburg army in the 1590s, but he does not provide any reference or details as to when and how this tactic was employed by the imperial troops. Overall, the question of whether the Habsburg infantry during the Long War used volley fire still remains to be answered definitively.

[54] For instance, Parker (2003, p. 45) gives an example of a Catholic scholar in the Dutch Republic in 1595 sending reports of the development of the countermarch to friends in Spanish service.

employed by the Habsburg army during the Long War. Mehmed Pasha was stationed on the Ottoman–Habsburg frontier for a significant period, and the bloody sieges and battles of the "hot war" should have enabled him to experience, understand and adopt the new tactics. For instance, when the Habsburg forces besieged Esztergom in 1595, they used a new bombardment technique, first firing their cannons at the same time and aiming the balls at one particular spot in the fortress, then firing the cannons one by one, still aimed at the same point. This method of bombardment proved highly effective, and Mehmed Pasha, at the time in charge of defending Esztergom, had to surrender the town to the imperial forces. Just one year later we see Mehmed Pasha using the same technique during the Ottoman siege of Eger, when he commanded the Ottoman forces under Mehmed III, and this contributed to the capture of this fortress (Derin–Çabuk 1980, vol. II, p. 193).[55]

Similarly, Ottoman commanders experienced the novelty and impact of the petard, a new and very effective high-tech incendiary weapon used by the Habsburgs during their surprise attack on the Ottoman garrison defending Győr in 1598. As noted in other contemporary sources, the Habsburgs took great pains to keep this weapon secret as it worked only in surprise attacks (Szalontay 2004, p. 155).[56] Hence, when they used the petard to blow up the gates of the fortress and thus recapture it, the Ottomans were shocked and awed by the new weapon's effect (Derin–Çabuk 1980, pp. 211–213; Yılmazer 2003, p. 234). Yet they had the chance to examine and learn the secrets of the petard when two pieces of this bomb later fell into their hands. Not surprisingly, they emulated and used it. For instance, the governor of Buda, Dev Süleyman Pasha, himself devised shrapnel bombs similar to the petard and exploded them successfully against the Habsburg forces who were besieging Buda in 1602 (Sağırlı 2000, p. 540).[57]

These are indeed important examples, showing both the vigilance of the Ottoman commanders and the dynamics of military acculturation between the two imperial armies during the Long War.[58] In sum, the positional warfare of the combined forces of the Habsburgs with exigent "aggregate firepower"[59] had been effective against the Ottomans since the early 1590s. It seems, however, that the Ottoman commanders reacted fairly quickly to the new Habsburg methods of field warfare and that they remained active observers of changes in contemporary European warfare in general. As long as these developments created new challenges for them, they searched for remedies, including direct emulation of Habsburg methods.

[55] Also mentioned in Imber (2005, p. 16) and Ágoston (2005a, p. 38).

[56] For an extended discussion of the use of the petard during the Long War, see Szalontay (2004, pp. 153–157).

[57] It should be also noted that as the Ottoman soldiers learned the secrets of this device, they became able to prevent any further petard attack from the enemy. Szalontay (2004, p. 156, n. 51) mentions that "[a] Venetian report from Prague by the Ambassador Piero Duodo also correctly emphasised that, since the painful loss of Győr in 1598, the Ottomans were able to defend themselves from any petard attack".

[58] For other Ottoman attempts to emulate Habsburg tactics, see Imber (2005).

[59] I take this term from Jeremy Black.

So were these Janissary drills and the volley fire outside Esztergom in 1605 merely Ottoman responses to a new challenge? And if not, how did the Ottomans come up with the idea of volley fire? Was it an innovation in its own right? And if it were emulation, when could the Ottomans have observed and learned this relatively new technique in Europe? As suggested above, could it be Habsburg volley fire that they mimicked? Is it even possible that they learned about the Dutch experiments?[60]

In the absence of detailed studies of Ottoman infantry firing techniques during the Long War with respect to the new tactics used by the two imperial armies, as well as studies of alternative patterns of diffusion of military innovations during this period, it is hard to provide definitive answers to these questions. At first sight, there seem to be three possible scenarios: (1) that the Habsburgs did in fact use volley fire sometime before 1605, and the Ottomans directly mimicked their tactic; (2) that the Ottomans invented and perfected volley fire themselves; and (3) finally, that some European "renegades" revealed this new tactic to the Ottomans.[61] Each of these alternatives is surely worth pursuing, but to do so would require more thorough research which exceeds the scope of this paper. However, in the light of available sources, the second scenario currently appears most plausible and, in order to facilitate more research and debate on this important question, some tentative arguments in support of it are advanced here.

V. Seeking for Beginnings

The idea of increasing infantry firepower by rotating the ranks was already familiar to the Ottomans by the early 16th century. One crucial example in this respect is the decisive battle of Mohács in 1526.[62] As Ágoston notes, "[M]ost European and Ottoman sources on Mohács attributed the Ottomans' success in the battle to the Janissa-

[60] In 1601, the Grand Vizier Damad İbrahim Pasha sent a victory missive (*feth-nâme*) to Queen Elizabeth I in which he refers to the battle of Nieuwpoort in 1600. This letter not only shows that the Ottoman commanders were promptly informed about developments in contemporary theatres of war, but also points to the possibility that the Ottomans knew about the Dutch experiments with volley fire. The relevant sections of the letter read: "The famous [English] commander [i.e. Sir Francis Vere] set about fighting and battling face to face in the province of Flanders with the accursed Archduke Alberte who is the brother of the perverted king"; and "The brother of the perverted king was crushed by irresistible might and routed, and the commander was made victorious and successful". PRO SP.102/61 fols. 87–88, lines 4–5. I am indebted to Claire Norton for this reference and translation. It should be also noted that the commander of the army fighting against the Spanish Habsburgs at this battle was not Sir Francis Vere but Prince Maurice of Nassau. Vere was commanding only the rear guard of the army. For further details and translations of this letter, see Norton (2005) and Stein (1986).

[61] It is well known that some "European" soldiers, among whom there were the veterans of the Army of Flanders, served the Ottomans in Hungary during the last years of the Long War, e.g., Christians from Poland and Transylvania in 1602–1603 or "Austrians" in the Esztergom campaign of 1605. It is thus possible that some of these soldiers could have had knowledge of volley fire and taught the Ottomans. On these "renegades", see Finkel (1992) and Sahin-Tóth (1994).

[62] For a discussion of this battle and the relevant contemporary sources, see Perjés (1989), Alföldi (1982) and Oman (1991, pp. 649–665).

ries' firepower and not to the cannons, in sharp contrast to later historians who usually claim that it was the Ottoman artillery that decided the fate of the Hungarians" (Ágoston 2005a, p. 24). All available contemporary evidence and recent scholarly work suggest that the firing technique used by the Janissaries during this battle was a form of volley fire and that it proved to be decisive.[63]

According to the account of Süleyman I's chancellor, Celalzade Mustafa, some 4000 Janissaries bearing firearms formed nine consecutive ranks behind the chained cannons and "fired their weapons rank by rank" (Kappert 1981, fols. 146b–147a).[64] Celalzade Mustafa's brother Salih, who in 1530 finished writing his version of this battle, mentions that the total number of Janissaries in ranks bearing firearms was 10,000 and that 2000 of these soldiers were commanded by the grand vizier İbrahim Pasha in the right wing.[65] As to the actual engagements, Celalzade Salih frequently notes the uninterrupted fire by the Janissaries deployed in rank formation (*tertîb-i sufûf üzre*).[66] Similarly, an Ottoman diary (*rûz-nâme*) of the campaign mentions that when the Hungarian forces attacked the central array of the Ottoman army, "the Janissary corps altogether fired [against the enemy] three or four times with their guns, and stopped and dispersed the infidels" (Feridun Bey 1857/58, vol. I, p. 562).[67] Furthermore, Kemalpaşazade, the chief jurisconsult of the time, who composed a history of the Hungarian campaign of 1526, testifies to the same end that the Janissaries "distributed bullets like hailstorm [and killed the enemy]" (Severcan 1996, pp. 299–300).[68] A Hungarian source presents a similar picture:

> Our heroes stood their ground and fought bravely against the foe. While the king's formation advanced in great haste as hastily as possible in full armor, the right wing began to retreat, and many fled; I believe the guns of the enemy must have terrified them, as it was only at this time that they began to flee. The rapid fire and the cannonballs whistling

[63] For a recent discussion of this battle, see *TDVİA*, s.v. "Mohaç Muharebesi", by Emecan. Emecan, without using the term "volley fire", describes the Janissaries' firing technique in this battle as follows: "The musketeer Janissaries dispersed the Hungarian cavalry by making sequential firing in several rotating ranks."

[64] "*Ve dört bin tüfenk-endâz yeniçeri… ceng-i sultânî 'âdetince tokuz saf tertîb olunup….*" "*…ve tüfenk-endâz saf saf tüfenkler atup….*" Celâlzâde also notes that these nine consecutive ranks were the traditional battle order of the Janissaries only when the sultan was present with the army. Hence, compared to later formations of the Janissaries in the Ottoman *Wagenburg*, at this battle they formed nine ranks instead of three. Nine consecutive ranks during this battle are also mentioned in other 16th-century Ottoman chronicles. See, for instance, Akgün (1995, p. 218).

[65] Celalzade Salih, *Tarih-i Feth-i Budun*, TSMK, MS R. 1280, fol. 44b: "*Hazret-i padişâh[un].. önünde on bin mikdarı harbe yarâr tüfenk-endâz… yeniçeri ta'ifesi…*" "*Rumili 'askeri bile sedd-i İskender gibi… önünde bir nice tob 'arabalarıyla iki bin tüfenkçi… yeniçeri….*"

[66] Ibid., fols. 45a–51a passim.

[67] "*Kral-ı bed-fi'âl sâ'ir asâkir-i hizlân ile hüdâvendigâr-ı sa'âdet-yâr ve Anatolı 'askeri üzerine yürüyüb, yeniçeri tâ'ifesi külliyen üç dört def'a tüfenkleriyle havâle olup küffâr-ı hâksârı men' ve def' idüb….*"

[68] "*Tüfenk-endāz serbāzlar tob otınıñ dûd-ı buludını ki, sehāb-ı pür-'azābidi, semāya aġdırub, tüfek-i tārek-şikeni hevā-yı veġādan tolı gibi yaġdırub, düşmen-i bed-kirdārıñ vücûd-ı bî-şudı gülşeniniñ berk ü bārın soldurdılar.*"

> above the heads of those of us next to the king aroused great fear in everyone.[69]

It is clear that the Janissaries' continuous and rapid hail of bullets was one of major factors behind the outcome of the battle. Thus, Géza Perjés, one of the authorities on the Battle of Mohács, is of the opinion that "The janissaries took the brunt of the fight… decimating the ranks of the Hungarians with murderous volleys…. The bulk of the Ottoman central army, including the janissaries, … had fired volleys at the Hungarian soldiers…. This shooting, unlike the firing of the artillery, had not only sound and fury, but impact as well: it caused havoc in the ranks of the Hungarians" (Perjés 1989).[70] Admittedly, the Janissary ranks successfully dispersed and/or destroyed the Hungarian cavalry and infantry forces by rotating in ranks and hence sustaining a remarkable barrage of fire.

Yet none of these accounts gives any further detail regarding how exactly the Janissary ranks managed to produce such constant and devastating firepower. This silence stems from the fact that "all the eyewitnesses reporting on the battle could observe only parts of it, since it was fought along a front 5–6 km wide. Moreover, the accounts dealing with specific episodes of the battle were written, with few exceptions, not by professional soldiers (hence the whole battle was for them nothing but chaos and confusion), or were deliberately distorted for one reason or another" (Perjés 1989).[71] Compensating for this shortcoming in contemporary narratives, an Ottoman miniature of this battle provides some intriguing details. This miniature is from 1558 and depicts the Janissaries' firing technique in the *Wagenburg*: the first rank are reloading their guns in a kneeling position (suggesting that they have already fired), while the second rank, standing on foot, continue to fire behind the chained cannons against the approaching Hungarian forces.[72] Although painted some thirty years after the battle, the miniature is very realistic in its depiction of the Janissaries' rotating ranks, though the painter is able to show only two of them whereas, as mentioned above, there were nine consecutive ranks in this battle. In addition, this depiction of the Janissaries, though much more stylised in its artistic representation, strikingly resembles that of Nakşi and Abdülkadir. Altogether these testimonies show that the Janissaries were fighting in three or nine consecutive ranks, and that they were firing and then reloading in a well-trained manner. (See Image 2 on p. 432.)

Moreover, the Janissaries continued to practice their well-established tactics and sustain their effective firepower throughout the 16th century. For instance, the account of a Spanish captive who had fallen into the hands of the Ottomans in the early 1550s mentions that the Safavids always avoided confronting the Ottoman army in a

[69] Brodarics's account, quoted in Perjés 1989: http://www.hungarian-history.hu/lib/warso/warso26.htm.

[70] Ibid.

[71] Ibid.

[72] This double-page miniature is found in Arifi Çelebi, *Süleymânnâme*, TSMK, MS H. 1517, fols. 219b–220a and published in Atıl (1986, pp. 136–137). Ágoston (2005a, p. 24, n. 35) also refers to the same miniature, which is reproduced in Kiss (1987, p. after 199). In order to zoom in on the Janissaries' fire, only fol. 219b is reproduced here.

Image 2. Arifi Çelebi, *Süleymânnâme*, TSMK, MS. H. 1517, fol. 219b. From Atıl (1986, p. 137)

field battle because the firepower of the Ottoman infantry easily defeated the Safavid cavalry charges. According to this account, the Janissaries' bullets used to fly like "a swarm of bees" so that if the very first bullets did not hit the enemy soldiers, the next ones definitely would (Ortola 2000, p. 735).

In sum, it is obvious that the Ottomans were aware of the effectiveness of rotating infantry fire as early as the 1520s, and that some Janissary infantrymen could fire in a kneeling position or reload their guns, apparently to allow the soldiers at the back to continue to deliver sequential fire. However, these points do not necessarily support the conclusion that the Ottomans actually used volley fire at Mohács. They may conceivably have used an effective "rapid fire" rather than volley fire *per se*. In any case, the above examples raise more questions than they answer concerning the genesis of Ottoman volley fire. Considering the fact that Janissaries bearing firearms had fought in the same formation within the Ottoman *Wagenburg* since at least the mid-15th century (e.g., at the field battles of Otlukbeli in 1473 and Çaldıran in 1514), it still remains an open question as to whether the Janissaries ever rotated to fire in sequential ranks in any of these earlier engagements. Hence, the evidence on the origins of Ottoman volley fire is currently inconclusive, and more detailed accounts pertaining to the actual rotation of the Janissary ranks before 1600 have yet to be found.

VI. Conclusion

While it has conventionally been assumed that the Ottomans did not employ volley fire among their infantry tactics and were therefore at a disadvantage when they fought the Habsburgs, thanks to Abdülkadir Efendi and Nakşi we now know that the Ottoman army was using volley fire in action during the Long War – and well before other armies were able to do so. However, due to the lack of detailed studies on infantry tactics during the Long War, as well as on alternative avenues for the diffusion of military innovations among early modern armies, it is very difficult to be more precise on the patterns by which the Ottoman volley developed. Thus, a number of questions remain unanswered and should be addressed by further studies utilising a larger pool of archival, narrative and visual sources, ideally from as many relevant national archives and libraries as possible.

Nonetheless, whatever the genesis of Ottoman volley fire, it is obvious that the Ottomans were quick to adapt (or, better, to acclimatise themselves to) the changing dynamics and new realities of warfare on their frontiers. Just as they had successfully embraced new weaponry (e.g., artillery) and tactics (e.g., the Hungarian *Wagenburg*) in earlier centuries, so they continued to look for alternative ways to keep their supremacy and military prowess in later periods. Therefore, the practice of volley fire by the Ottoman army should be understood first and foremost within the context of the Long War and the military landscape of Hungary, both of which created a crucial testing and learning ground for the Habsburg and Ottoman armies alike. It is clear that as the new-style war in Hungary dictated increasing numbers of musket-bearing soldiers, more newly-recruited soldiers were deployed to the theatres of war after receiv-

ing training in new tactics and weaponry. However, it should be emphasised that, since the 15th century, the Ottomans had a well-organised, well-trained, well-equipped and disciplined standing army which could and did use new infantry tactics without making major changes in their battle formations. Accordingly, the said "revolutionary" impact of volley fire over the development of standing armies and new battle formations does not directly apply to the Ottoman case and the Janissaries use of volley fire rather reveals an alternative mode of adoption: Assuming any earlier Janissaries' firing technique was not volley fire, and given the new challenges of the Long War, Lala Mehmed Pasha (or any other commander) might have devised and drilled a new tactic or improved the former tactic of shooting in ranks in order to counterbalance the numerically superior Habsburgs and their intensive infantry firepower. Since the Janissaries had always fought in consecutive ranks in the *Wagenburg*, the adoption of volley fire into their battle formation should have been relatively very smooth and creating only an "evolutionary" rather than a "revolutionary" change in Ottoman military organisation.

The above examples also indicate that more than one route existed for the diffusion of military techniques in the early modern world and that a "hot war" constituted a critical opportunity for emulating, inventing and perfecting new tactics. Accordingly, early modern Hungary constituted a stage where technological and tactical innovations, developments and interactions, personal observations and relations could and did take place. This article therefore supports those scholars who have pointed to the innovative character of the Hungarian theatre of war, yet with one crucial addition: any analysis of the "Military Revolution in Hungary" should consider Ottoman tactics, reactions, innovations and emulations, not just the achievements of the Habsburgs.

Finally, scholars participating in the Military Revolution Debate have begun to emphasise the significance of the lack of "non-European" sources in establishing a proper global context and, accordingly, a more balanced understanding of developments in different military systems (Barker et al. 1997; Black 2004b). Adding non-European sources to the debate is more easily said than done until more sources on non-western warfare become available in print and preferably in translation so as to enable scholars to overcome the various language barriers. The brief excerpt from Abdülkadir's chronicle and the reproduction of Nakşi's illustration featured in this article help to demonstrate that Ottoman sources can provide crucial information for a fuller assessment not only of early modern Ottoman warfare – still a sidelined topic within New Military History – but also of the so-called Military Revolution Abroad. Above all, these examples also remind historians who stress the contrast between the "European Military Revolution" and developments in non-European warfare never to mistake "absence of evidence" for "evidence of absence".

References

Ágoston, G. (1994): Ottoman Artillery and European Military Technology in the Fifteenth and Seventeenth Centuries. *Acta Orientalia Academiae Scientiarum Hungaricae* Vol. 47:1–2, pp. 15–48.

Ágoston, G. (1998): Habsburgs and Ottomans: Defense, Military Change and Shifts in Power. *The Turkish Studies Association Bulletin* Vol. 22:1, pp. 126–141.

Ágoston, G. (1999): Ottoman Warfare in Europe, 1453–1826. In: Black, J. (ed.): *European Warfare, 1453–1815*. New York, St. Martin's Press, pp. 118–144.

Ágoston, G. (2001): Merces Prohibitae: The Anglo-Ottoman Trade in War Material and the Dependency Theory. *Oriente Moderno* n.s. Vol. 20:1, pp. 177–192.

Ágoston, G. (2005a): *Guns for the Sultan: Military Power and the Weapons Industry in the Ottoman Empire*. Cambridge, Cambridge University Press.

Ágoston, G. (2005b): Behind the Turkish War Machine: Gunpowder Technology and War Industry in the Ottoman Empire, 1450–1700. In: Steele, B.–Dorland, T. (eds): *The Heirs of Archimedes: Science and the Art of War through the Age of Enlightenment*. Cambridge, MA, The MIT Press, pp. 101–133.

Akgün, A. (1995): *Hoca-zade Mehmed Efendi'nin İbtihâcü't-tevârîh'i*. Unpublished Ph.D. Dissertation. Istanbul University.

Akgündüz, A. (ed.) (1996): *Kavânîn-i Yeniçeriyân-ı Dergâh-ı Âlî,* in *Osmanlı Kanunnâmeleri ve Hukukî Tahlilleri*. Volume 9/1. Istanbul: Osmanlı Araştırmaları Vakfı. [Transcribed text, pp. 127–268; facsimile of the manuscript, pp. 269–367].

Aksan, V. (2002): Ottoman Military Matters. *Journal of Early Modern History* Vol. 6:1, pp. 52–62.

Alföldi, L. M. (1982): The Battle of Mohács, 1526. In: Bak, J. M.–Király, B. K. (eds): *From Hunyadi to Rákóczi: War and Society in Late Medieval and Early Modern Hungary*. New York, Brooklyn College Press, pp. 189–202.

Andújar del Castillo, F. (ed.) (2000): Martín de Eguiluz, *Milicia, Discurso y Regla Militar*. Madrid, Ministerio de Defensa.

Atıl, E. (ed.) (1986): *Süleymanname: The Illustrated History of Süleyman the Magnificent*. Washington, DC, National Gallery of Art and New York, Harry N. Abrams.

Barker, T. M.–Black, J.–Cook, W. F.–Parker, G. (1997): Geoffrey Parker's *Military Revolution*: Three Reviews of the Second Edition. *The Journal of Military History* Vol. 61:2, pp. 347–354.

Basta, G. (1606): *Il maestro di campo generale*. Venice, G. B. Ciotti.

Black, J. (1991): *A Military Revolution? Military Change and European Society, 1550–1800*. New Jersey, Humanities Press.

Black, J. (2004a): *Rethinking Military History*. London, Routledge.

Black, J. (2004b): A Wider Perspective: War outside the West. In: Mortimer, G. (ed.): *Early Modern Military History, 1450–1815*. New York, Palgrave, pp. 212–226.

Çerci, F. (ed.) (2000): *Gelibolulu Mustafa Âlî ve Künhü'l-Ahbâr'ında II. Selim, III. Murat ve III. Mehmet Devirleri*. Three Volumes. Kayseri, Erciyes Üniversitesi Yayınları.

Çuhadar, İ. H. (ed.) (2003): *Mustafa Sâfî'nin Zübdetü'l-Tevârih'i*. Ankara, Türk Tarih Kurumu.

Dávid, G.–Fodor, P. (eds) (2000): *Ottomans, Hungarians and Habsburgs in Central Europe: The Military Confines in the Era of Ottoman Conquest*. Leiden, Brill.

De León, F. G. (2004): Spanish Military Power and the Military Revolution. In: Mortimer, G. (ed.): *Early Modern Military History, 1450–1815*. New York, Palgrave, pp. 25–42.

Derin, F. Ç.–Çabuk, V. (eds) (1980): İbrahim Peçevi, *Tarih-i Peçevî*. Reprint edition. Two Volumes. Istanbul.

Dizionario Biografico degli Italiani, s.v. "Basta" by G. De Caro. Volume 7, pp. 155–157.
Eltis, D. (1995): *The Military Revolution in Sixteenth-century Europe*. New York, I.B. Tauris.
Encyclopaedia of Islam, 2nd ed., s.v. "Mehmed Pasha, Lala" by A. H. de Groot. Volume 6, pp. 996–997.
Encyclopaedia of Islam, 2nd ed., s.v. "Yeñi Çeri" by R. Murphey. Volume 11, pp. 322–331.
Erkan, D. (2005): *Matrâkçı Nasûh'un Süleymân-nâmesi (1520–1537)*. Unpublished M.A. Thesis. Marmara University.
Faroqhi, S. (1997): Crisis and Change. In: İnalcık, H.–Quataert, D. (eds): *An Economic and Social History of the Ottoman Empire*. Cambridge, Cambridge University Press, pp. 411–636.
Feridun Bey (1857/58): *Mecmua-ı Münşeât-ı Selâtin*. Two Volumes. Istanbul.
Fetvacı, E. F. (2005): *Viziers to Eunuchs: Transitions in Ottoman Manuscript Patronage, 1566–1617*. Unpublished Ph.D. Dissertation. Harvard University.
Finkel, C. (1992): French Mercenaries in the Habsburg-Ottoman War of 1593–1606: The Desertion of the Papa Garrison to the Ottomans in 1600. *Bulletin of the School of Oriental and African Studies* Vol. 55:3, pp. 451–471.
Finkel, C.–Ágoston, G. (1997): XV. ve XVI. Yüzyıllarda Büyük Meydan Muharebelerinde Uygulanan Strateji ve Taktikler. In: *XV. ve XVI. Asırları Türk Asrı Yapan Değerler*. Istanbul, İslami İlimler Araştırma Vakfı, pp. 155–184.
Finkel, F. (1988): *The Administration of Warfare: The Ottoman Military Campaigns in Hungary, 1593–1606*. Vienna, Verband der wissenschaftlichen Gesellschaften Österreichs.
Fodor, P. (1986): State and Society, Crisis and Reform, in 15th–17th Century Ottoman Mirror for Princes. *Acta Orientalia Academiae Scientiarum Hungaricae* Vol. 40:2–3, pp. 217–240.
Forster, E. S. (Trans.) (1967): *The Turkish Letters of Ogier Ghiselin de Busbecq*. Oxford, Clarendon Press.
Hathaway, J. (1996): Problems of Periodization in Ottoman History: The Fifteenth through the Eighteenth Centuries. *The Turkish Studies Association Bulletin* Vol. 20:2, pp. 25–31.
Horváth, I. (2003): Ottoman Military Construction in Esztergom. In: Gerelyyes, I.–Kovács, G. (eds): *Archeology of the Ottoman Period in Hungary*. Budapest, Hungarian National Museum, pp. 75–87.
Imber, C. (2002): *The Ottoman Empire, 1300–1650: The Structure of Power*. New York, Palgrave.
Imber, C. (2005): Ibrahim Peçevi on War: A Note on the 'European Military Revolution'. In: Imber, C.–Kiyotaki, K.–Murphey R. (eds): *Frontiers of Ottoman Studies: State, Provinces, and the West*. Volume Two. London–New York, I.B. Tauris, pp. 7–22.
Ivanics, M. (2002): The March of the Imperial Forces to Kanizsa in Contemporary Illustrations. In: Güzel, H. C.–Oğuz, C. C.–Karatay, O. (eds): *The Turks*. Ankara, Yeni Türkiye, pp. 351–358.
İnalcık, H. (1975): Socio-Political Effects of the Diffusion of Fire-arms in the Middle East. In: Parry, V. J.–Yapp, M. E. (eds): *War, Technology and Society in the Middle East*. London, Oxford University Press, pp. 195–217.
İnalcık, H. (1980): Military and Fiscal Transformation in the Ottoman Empire, 1600–1700. *Archivum Ottomanicum* Vol. 6, pp. 283–337.
İnalcık, H. (2004): Mutual Political and Cultural Influences between Europe and the Ottomans. In: İnalcık, H.–Renda, G. (eds): *Ottoman Civilization*. Volume Two. Ankara, Kültür ve Turizm Bakanlığı Yayınları, pp. 1049–1089.
İpşirli, M. (ed.) (1999): Selaniki Mustafa Efendi, *Tarih-i Selânikî*. Two Volumes. 2nd ed. Ankara, Türk Tarih Kurumu.
İslam Ansiklopedisi, s.v. "Mehmed Paşa, Lala" by M.C.Ş. Tekindağ. Volume 7, pp. 591–594.

Kafadar, C. (1997–1998): The Question of Ottoman Decline. *Harvard Middle Eastern and Islamic Review* Vol. 4:1–2, pp. 30–75.

Káldy-Nagy, G. (1979): The First Centuries of the Ottoman Military Organization. *Acta Orientalia Academiae Scientiarum Hungarica* Vol. 31, pp. 147–183.

Kappert, P. (ed.) (1981): *Geschichte Sultan Süleymān Kānūnīs von 1520 bis 1557, oder, Tabakāt ül-Memālik ve Derecāt ül-Mesālik von Celālzāde Mustafā genannt Koca Nişāncı*. Facsimile edition. Wiesbaden, Franz Steiner Verlag GMBH.

Kelenik, J. (2000): The Military Revolution in Hungary. In: Dávid–Fodor 2000, pp. 118–159.

Kirişcioğlu, M. (ed.) (2001): *Câfer Iyânî, Tevârîh-i Cedîd-i Vilâyet-i Üngürüs (Osmanlı–Macar Mücadelesi Tarihi, 1585–1595)*. Istanbul, Kitabevi.

Kiss, K. (ed.) (1987): *Mohács Emlékezete*. Budapest, Európa Könyvkiadó.

Knolles, R. (1603): *The Generall Historie of the Turkes… Together with the Lives and Conquests of the Othoman Kings and Emperours… digested into one continuat Histroie untill this present yeare 1603*. London.

Köhbach, M. (1981): Der osmanische Historiker Topcılar Kātibi Abdü'l-qādir Efendi. Leben und Werk. *Osmanlı Araştırmaları/Journal of Ottoman Studies* Vol. 2, pp. 75–96.

Külekçi, N. (1985): *Ganî-zâde Nâdirî: Hayatı, Edebî Kişiliği, Eserleri, Divânı ve Şeh-nâmesi'nin Tenkidli Metni*. Unpublished Ph.D. Dissertation. Atatürk Üniversitesi.

Murphey, R. (1999): *Ottoman Warfare, 1500–1700*. New Brunswick, NJ, Rutgers University Press.

Niederkorn, J. P. (1993): *Die europäischen Mächte und der „Lange Türkenkrieg" Kaiser Rudolfs II, 1593–1606*. Vienna, Verlag der österreichischen Akademie der Wissenschaften.

Norton, C. (2005): *Plural Pasts: The Role of Function and Audience in the Creation of Meaning in Ottoman and Modern Turkish Accounts of the Sieges of Nagykanizsa*. Unpublished Ph.D. Dissertation. University of Birmingham.

Oman, C. W. C. (1991): *A History of the Art of War in the Sixteenth Century*. London, Greenhill.

Orhonlu, C. (ed.) (1970): *Osmanlı Tarihine Âid Belgeler: Telhîsler (1597–1607)*. Istanbul, Istanbul Üniversitesi Edebiyat Fakültesi Yayınları.

Ortola, M. (ed.) (2000): *Viaje de Turquía: Diálogo entre Pedro de Hurdimalas y Juan de Voto a Dios y Mátalas Callando que trata de las miserias de los cautivos de turcos y de las costumbres y secta de los mismos hacienda la descripción de Turquía*. Madrid, Editorial Castalia.

Parker, G. (1996): *The Military Revolution: Military Innovation and the Rise of the West, 1500–1800*. 2nd ed. Cambridge, Cambridge University Press.

Parker, G. (2003): From the House of Orange to the House of Bush: 400 years of Revolutions in Military Affairs. In: Lynn, J. A. (ed.): *Coming to the Americas: The Eurasian Military Impact on the Development of the Western Hemisphere. Acta of the XXVIII International Conference of Military History*. Wheaton, Cantigny First Division Foundation, pp. 40–71.

Parker, G. (2007): From the House of Orange to the House of Bush: 400 Years of "Revolutions in Military Affairs". *Journal of Military History* (forthcoming).

Parry, V. J. (1975): La manière de combattre. In: Parry, V. J.–Yapp, M. E. (eds): *War, Technology and Society in the Middle East*. London, Oxford University Press, pp. 218–256.

Perjés, G. (1989): *The Fall of the Medieval Kingdom of Hungary: Mohács 1526–Buda 1541*. Trans. Márió D. Fenyó. New Jersey: Atlantic Research and Publication, Inc. Online edition at http://www.hungarian-history.hu/lib/warso/.

Rogers, C. J. (ed.) (1995): *The Military Revolution Debate*. Boulder, Westview Press.

Sağırlı, A. (2000): *Mehmed bin Mehmed er-Rûmî (Edirneli)'nin Nuhbetü't-tevârih ve'l-ahbar'ı ve Târîh-i Âl-i Osman'ı (Metinleri, Tahlilleri)*. Unpublished Ph.D. Dissertation. Istanbul University.

Sahin-Tóth, P. (1994): À propos d'un article de C.F. Finkel: quelques notations supplémentaires concernant les mercenaires de Pápa. *Turcica* Vol. 26, pp. 249–255.

Schmidt, J. (1985): The Egri-Campaign of 1596: Military History and the Problem of Sources. In: Tietze, A. (ed.): *Habsburgisch-osmanische Beziehungen – Relations Habsburg-ottomanes, Colloque sous le patronage du Comité international des études pré-ottomanes et ottomans*. Vienna, Verlag des Vernbandes der wissenschaftlichen Gesellschaften Österreichs, pp. 125–144.

Severcan, Ş. (ed.) (1996): Kemal Paşa-zâde, *Tevarih-i Âl-i Osman, X. Defter*. Ankara, Türk Tarih Kurumu.

Stein, J. M. (1986): A Letter to Queen Elizabeth I from the Grand Vezir as a Source for the Study of Ottoman Diplomacy. *Archivum Ottomanicum* Vol. 11, 231–247.

Szalontay, T. (2004): *The Art of War during the Ottoman-Habsburg Long War (1593–1606) According to Narrative Sources*. Unpublished Ph.D. Dissertation. University of Toronto.

Şakul, K. (2003): Osmanlı Askerî Tarihi Üzerine Bir Literatür Değerlendirmesi. *Türkiye Araştırmaları Literatür Dergisi* Vol. 1:2, pp. 529–571.

Tacan, N. (1936): *Batı Türklerinin (Osmanlıların) Teessüs ve İstilâ Devirlerinde Harb Güdemi Usulleri*. Istanbul, Askeri Matbaa.

Tanındı, Z. (1996): *Türk Minyatür Sanatı*. Ankara, Türkiye İş Bankası Yayınları.

Tanındı, Z. (2003): Transformation of Words to Images. *Ars* Vol. 43, pp. 131–145.

Tóth, S. L. (2000): *A mezőkeresztesi csata és a tizenöt éves háború*. Szeged, Belvedere.

Townshed, C. (ed.) (1997): *The Oxford Illustrated History of Modern War*. Oxford, Oxford University Press.

Türkiye Diyanet Vakfı İslam Ansiklopedisi, s.v. "Lala Mehmed Paşa" by M. Ak. Volume 28, pp. 71–73.

Türkiye Diyanet Vakfı İslam Ansiklopedisi, s.v. "Mohaç Muharebesi" by F. Emecan. Volume 30, pp. 232–235.

Uzunçarşılı, İ. H. (1943): *Osmanlı Devleti Teşkilatından Kapukulu Ocakları*. Volume One. Ankara, Türk Tarih Kurumu Basımevi.

Ünver, S. (1949): *Ressam Nakşi: Hayatı ve Eserleri*. Istanbul, Istanbul Üniversitesi Yayınları.

Von Randa, A. (1964): *Pro republica Christiana; die Walachei im „Langen" Türkenkrieg der katholischen Universalmächte (1593–1606)*. Munich, Fremdsprachendruckerei P. Belej.

Wratislaw, A. H. (Trans.) (1862): *Adventures of Baron Wenceslas Wratislaw of Mitrowitz*. London, Bell and Daldy.

Yılmazer, Z. (ed.) (2003): *Topçular Kâtibi 'Abdülkādir (Kadrî) Efendi Tarihi*. Two Volumes. Ankara, Türk Tarih Kurumu.

Zeyrek, Y. (ed.) (2001): [Ebubekir b. Abdullah], *Tarih-i Osman Paşa*. Ankara, Kültür Bakanlığı Yayınları.