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**THE MILITARY  
REVOLUTION IN EARLY  
MODERN EUROPE**

A Revision

**Frank Jacob and  
Gilmar Visoni-Alonzo**



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macmillan

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## Introduction

**Abstract** The concept of the Military Revolution has dominated the historical debate since Michael Roberts presented it in 1955, and it received new impetus in 1988 with the publication of Geoffrey Parker's work. Since then many studies have eroded the solidity of the thesis. The authors claim that there was no Military Revolution at all. They assert that the changes in the practice of war observed in Europe during the Early Modern period took place on a global scale, occurred numerous times throughout history, and are part of an endless evolutionary process of research and development prompted by immediate threats.

**Keywords** Military revolution • Global history • Early modern Europe

There never was a Military Revolution. Though this statement might lead to us being ostracized from the field of military history, the present book intends to explain and prove our claim. We are well aware that our thesis stands in contrast to everything that has been written on this subject in recent decades. Nonetheless, we believe that the concept of a Military Revolution is not helpful, nor are there any provable instances of such revolutions. Rather, it is an artificial construct that is supposed to help explain the dominance of the West in the age of colonialism; it therefore expresses Eurocentric assumptions as opposed to being based in historical proof. In recent years this point seems to have been proven by the works

of scholars in African, Asian, and Latin American Studies. Drawing on this work, we call for the concept of the Military Revolution to be entirely repealed. Such revolutions are myths, as we will demonstrate in detail on the pages that follow.

For more than 50 years, the notion of the Military Revolution has been expounded and promoted by countless scholars around the world. Peter Brown, a specialist in Russian history, however, has recently remarked that there are steadily growing doubts about a concept that “unquestionably bears signs of discursive fatigue and the arcane, inasmuch as it has made the rounds for so long.” Regardless of his feelings towards the concept, Brown is not willing to abandon the terminology. He rather argues for a repositioning of the concept “with ‘early modern European military evolution’ or ‘early modern European arms race’ plausibly being better tooled appellations.”<sup>1</sup> We go a step further. The term Military Revolution has no fit at all. And it seems to us useless to stick with a model that is derived more from Eurocentric bias than historical fact.

We thereby echo the demands for a New Military History as expressed by John Whiteclay Chambers in 1991. As military historians we are far more “interested in social and political history, technology, culture, and the relationship of war and the military to society, the state, and international relations,”<sup>2</sup> even if that means that we have to abandon a concept which has become an article of faith for many decades.

The term ‘revolution’ usually implies political changes that are achieved in a short period of time, and in the majority of cases by the use of violence.<sup>3</sup> Following the definition of Forrest D. Colburn, a “revolution is the sudden, violent, and drastic substitution of one group governing a territorial political entity for another group formerly excluded from the government, and an ensuing assault on state and society for the purpose of

<sup>1</sup>Peter B. Brown, “Gazing Anew at Poltava: Perspectives from the Military Revolution Controversy, Comparative History, and Decision-Making Doctrines,” *Harvard Ukrainian Studies* 31:1/4, Poltava 1709: The Battle and the Myth (2009–2010), 107.

<sup>2</sup>John Whiteclay Chambers, “Conference Review Essay: The New Military History: Myth and Reality,” *The Journal of Military History* 55:3 (1991), 395.

<sup>3</sup>Jean-Alain Lesourd, “Revolution,” *Internationales Jahrbuch für Geschichtsunterricht* 7 (1959/60), 315. Nicolas Olsson-Yaouzis (in “An Evolutionary Dynamic of Revolutions,” *Public Choice* 151 (2012), 497–515) argues that social revolutions evolve in some kind of evolutionary circle; however the revolution itself is usually a “fast” process.

radically transforming society.”<sup>4</sup> Political scientists have recently discussed whether there is any possibility at all for future revolutions to take place,<sup>5</sup> but given that they have been an essential part of our history, it seems likely that in one form or another they will occur in the centuries to come as well. Revolutions are as important for international relations as they are for the study of history. To quote political scientist Stephen M. Walt, they “cause abrupt shifts in the balance of power, place alliance commitments and other international agreements in jeopardy, and provide inviting opportunities for other states to improve their positions.” However, “true revolutions are a relatively rare occurrence.”<sup>6</sup> From a political perspective revolutions are “violent political struggles over the basic principles by which society is organized.”<sup>7</sup> Clifton B. Kroeber also made clear that a “revolution is successful only where a movement overturns a regime.”<sup>8</sup> A revolution has therefore to cause not only a change of rule, but also a change of the ruling system. The revolution continues, or seeks to continue, until this change is achieved. As has been argued, revolutions happen in a revolutionary circle that is brought to an end only by a change that is accepted by a majority of the population.<sup>9</sup> To define the term “revolution” we may again quote Kroeber:

...it seems well to avoid adjectives such as social, cultural, economic, and political—words that from the outset seem to confine one’s view within one or another academic discipline. What these adjectives bring into the picture is the parochial view of the writer’s own field of study, so that social, cultural, economic, or political turn out to be meaningless qualifications that once again start us toward smaller, more limited views.<sup>10</sup>

<sup>4</sup> Forrest D. Colburn, *The Vogue of Revolution in Poor Countries* (Princeton: Princeton University Press, 1994), 6.

<sup>5</sup> Robert S. Snyder, “The End of Revolution?” *The Review of Politics* 61:1 (1999), 7.

<sup>6</sup> Stephen M. Walt, “Revolution and War,” *World Politics* 44:3 (1992), 321.

<sup>7</sup> *Ibid.*

<sup>8</sup> Clifton B. Kroeber, “Theory and History of Revolution,” *Journal of World History* 7:1 (1996), 22.

<sup>9</sup> Frank Jacob and Riccardo Altieri, “Einleitung: Die Russische Revolution und ihre Bedeutung,” in *Die Geschichte der Russischen Revolutionen: Erhoffte Veränderung, erfahrene Enttäuschung, gewaltsame Anpassung*, ed. Riccardo Altieri and Frank Jacob (Bonn: Minifanal, 2015), 7–27.

<sup>10</sup> Kroeber, *Theory*, 25.

The term “Military Revolution”—created by scholars who try to tie the revolutionary impact of military developments to a particular period of human history and circumscribe them geographically—engenders exactly such a limitation of view. William E. Lipsky warned us of the danger that “different scholars, working within different frames of reference, have simply selected those aspects which seem most important to them,”<sup>11</sup> while losing the ability to differentiate between their own wishes and the historical facts.

In the case of the theory of Military Revolutions, technology plays an important role. Economist and LSE professor Francesco Caselli provides a detailed description of the interrelationship between technology and skill as is required to create progress (something that is true for military progress as well):

A technology is a combination of machines of a certain type and workers who have the skills necessary to use them. A technological revolution is the introduction of a new type of machines. Machines of the new type are more productive than machines of preexisting types, but they can only be operated by workers who have developed a set of machine-specific skills. The acquisition of such skills is costly, and the labor force is heterogeneous in the cost of acquisition. The revolution is skill biased if the new skills are more costly to acquire than the skills required by preexisting types of equipment. The revolution is de-skilling if the new skills can be acquired at a lower cost than the skills associated with preexisting technologies.<sup>12</sup>

This long quotation is intended to give the reader an idea of the ways the term “revolution” is misused. The combination of a new technology with a new set of skills, something that is a natural form of research and development, is sufficient for some scholars to frame it as a revolution. However, the development of new (military) technology does not necessarily have to change society as a whole. Nor must it lead to a change of rule. We therefore have to be very careful when we determine something as revolutionary, even if the use of this emblematic terminology is an means to sell a new theory to an interested readership—think of the many ‘revolutions’ in pop music with which we are confronted every year.

<sup>11</sup> William Lipsky, “Comparative Approaches to the Study of Revolution: A Historiographic Essay,” *Review of Politics* 38 (1976), 498.

<sup>12</sup> Francesco Caselli, “Technological Revolutions,” *The American Economic Review* 89:1 (1999), 78.

Regardless of the warnings, “many analysts now believe that profound changes in the technology of war may be causing a revolutionary transformation in the conduct of war in general and in the character of conventional military operations in particular.”<sup>13</sup> But at this point we have to ask a very important question: Do new weapons revolutionize war? The way it is fought might be different, but reasons and aims have remained similar throughout history. Martin van Creveld observed that a history of war is impossible if one does not take political, economic, social, and technological aspects into consideration.<sup>14</sup> War is determined by all of these, and a history of warfare cannot be just a history of events. He was not the first who recognized this fact. Werner Sombart (1863–1941) wrote about the interrelationship of war and capitalism in 1913,<sup>15</sup> and many other scholars have discussed individual factors and their influence on warfare per se. The interrelationship between technology and warfare (as well as science and warfare) is as old as war itself; human beings have always tried to kill each other. However, with regard to the method of killing as changed by the introduction of new military technology, too close a focus on early modern times or the age of high industrialization can no longer be accepted,<sup>16</sup> since we can trace a more visible interconnection among science, technology, and war in the decades between 1914 and 1945.

The concept of war itself has never changed with regard to its aims. If a war is a form of collective violence—performed by one collective against another one, usually in an ordered form by professional personnel, to achieve economic, political, religious, or social aims—the method to fight a war remains to kill without being killed. This truth is immutable. Nor have political regimes often been caused to collapse by the introduction of new technologies for more effective warfare. It might be true that social and political consequences may be observed in relation to modernization processes in the military sector, but it is more than dubious to call this process revolutionary, especially since we are going to show that these

<sup>13</sup>W. Seth Carus, “Military Technology and the Arms Trade: Changes and Their Impact,” *Annals of the American Academy of Political and Social Science* 535: The Arms Trade: Problems and Prospects in the Post-Cold War World (1994), 164.

<sup>14</sup>Martin van Creveld, *Die Gesichter des Krieges. Der Wandel bewaffneter Konflikte von 1900 bis heute* (Munich, Siedler Verlag, 2009), 8.

<sup>15</sup>Werner Sombart, *Krieg und Kapitalismus* (Munich, Duncker & Humblot, 1913).

<sup>16</sup>Anselm Doering-Manteuffel, “Kriegserfahrungen, Wissenschaft und Technik,” in *Kriegserfahrungen – Krieg und Gesellschaft in der Neuzeit. Neue Horizonte der Forschung*, ed. G. Schild and A. Schindling (Paderborn, Ferdinand Schöningh, 2009), 197.

processes are global, numerous, and a perennial part of human history. We are therefore arguing against the use of the term “Military Revolution” *in toto*. The term is not helpful in describing the processes that underlie military transformations. It is a limiting concept, geographically as well as with regard to the impact of historical events. And it has been proven wrong by the research of scholars in non-European and global history. Consequently, we propose a shift not only in terminology but also in the conceptualization of the historical phenomena that have been studied under the term Military Revolution. The concept to be used in the future should be one that describes an *evolutionary* process of research, trial, development, and implementation in the military sector. This evolutionary process is determined by peaks of progress achieved by the urgent need for a technological, tactical and strategic advantage over an enemy who threatens the predominant position of an already existent power. Wars are therefore the natural peaks of progress in history, since a losing power is willing to adopt new concepts and technologies to improve its chances of winning the conflict. Those who lose a war usually try to draw lessons to prepare themselves for conflict in future. This interrelation keeps the circular process of development running and creates military evolution. In periods of peace the process usually runs more slowly than in war, giving the false impression of a Military Revolution that is in fact just a peak within the perennial evolutionary cycle.

Putting aside the fact that we do not believe in the value of the concept of a Military Revolution, we want to give our readers an opportunity to come to their own conclusions. Therefore we are not omitting the theoretical canon, but will provide a short survey of the debate on Military Revolutions before describing its workings in detail.

In 1955 Michael Roberts introduced the concept of Military History in what Geoffrey Parker later called “one of the most influential inaugural lectures ever given: ‘The Military Revolution, 1560–1660.’”<sup>17</sup> Roberts declared that the military changes that occurred in Europe between 1560 and 1660 were so tremendous that one would have to call them simply revolutionary.<sup>18</sup> While Roberts was not the first to express this view, and

<sup>17</sup> Geoffrey Parker, “The ‘Military Revolution,’ 1560–1660: From Belfast to Barcelona and the Hague,” *The Journal of Military History*, 69:1 (2005), 205. The original thesis by Roberts was published as “The Military Revolution,” in Michael Roberts, *Essays in Swedish History* (Minneapolis: University of Minnesota Press, 1966), 195–225.

<sup>18</sup> Michael C. Paul, “The Military Revolution in Russia, 1550–1682,” *The Journal of Military History*, 68:1 (2004), 9.

notably Charles W.C. Oman had referred to it long before,<sup>19</sup> the idea “rapidly became the ‘new orthodoxy’ in early modern military history.”<sup>20</sup> In 1976, however, in his famous article “The ‘Military Revolution,’ 1560–1660—a Myth?,”<sup>21</sup> Geoffrey Parker criticized Roberts for having focused too much on Gustavus Adolphus and omitting events in France, the Hapsburg Empire, and the Netherlands. The changes in siege warfare were decisive for Parker, who reframed the time period of the Military Revolution as the beginning of the sixteenth century.<sup>22</sup>

Parker retained the concept of a Military Revolution “as a time of major change in warfare and military organization”<sup>23</sup> and also accepted the influence of Robert’s four factors responsible for the revolutionary development: changes in tactics, a new strategy, an increase in the level of warfare per se, and its influence on society as a whole.<sup>24</sup> For Parker it was the consequences of the changes in warfare that made the developments revolutionary: “The greater destructiveness, the greater economic costs, and the greater administrative challenge of the augmented armies made war more of a burden and more of a problem for the civilian population and their rulers than ever before.”<sup>25</sup> For him the most important factors in the Military Revolution in early modern Europe were the fortifications of the *trace italienne* and the consequent need for a new form of siege warfare.<sup>26</sup> This new style of fortress caused the European armies to grow and required ways of simultaneously keeping them cost-effective and militarily capable. The combination of pikemen with *arquebusiers* or musketeers who could use the new gunpowder technology made this possible, while also transforming the battlefields of Europe. For Parker

the revolution in military manpower between 1530 and 1710 was extremely important. It certainly had all the significant consequences which Roberts attributed to it: it made war impinge more upon society; it increased the

<sup>19</sup> Charles W. C. Oman, *The Art of War in the Middle Ages*, revised and edited by John H. Beeler (Ithaca, NY: Cornell University Press, 1953), 162.

<sup>20</sup> Clifford J. Rogers, “The Military Revolutions of the Hundred Years’ War,” *The Journal of Military History* 57:2 (1993), 242.

<sup>21</sup> Geoffrey Parker, “The ‘Military Revolution,’ 1560-1660 – a Myth?” *The Journal of Modern History*, 48:2 (1976): 195–214.

<sup>22</sup> Rogers, *Military Revolutions*, 242.

<sup>23</sup> Parker, *Myth?*, 195.

<sup>24</sup> *Ibid.*, 197.

<sup>25</sup> *Ibid.*

<sup>26</sup> *Ibid.*, 203.

authority of the state (partly at the expense of the citizen); it accentuated social mobility; and it undoubtedly retarded the economic development of most participants (although it stimulated that of many neutrals). In addition, it certainly helped to precipitate the numerous confrontations between governments and the governed which are commonly referred to as the “general crisis” of the seventeenth century. The “prodigious increase in the scale of warfare” alone merits the title of “military revolution” which Roberts bestowed upon it twenty years ago.<sup>27</sup>

Thus Parker adopted Roberts’s basic idea; he just adjusted it chronologically. Later, others tried to expand his theory geographically as well as with regard to the key technologies. Anirudh Deshpande, for example, pointed to the impact of “the gradual evolution of the heavily armed sailing ship”<sup>28</sup> between 1450 and 1650 to explain European expansion as a consequence of military supremacy as it was created by the Military Revolution. Despite the fact that Parker mainly focused on the changes in tactics and strategy as they happened to take place in Sweden, the Netherlands, Italy, and other parts of Europe, he made them responsible for the success of European colonialism in other parts of the world.<sup>29</sup> Problematic in this regard is that Parker did not take a closer look at the non-European settings. Indigenous problems were largely responsible for the “Rise of the West” as well and, as will be shown later, the events researchers in this particular field would call Military Revolutions were not exclusively European in early modern times. In 1991 Jeremy Black also reassessed Roberts’s original theory of a Military Revolution, mainly arguing that the changes did not occur before the end of the seventeenth century.<sup>30</sup> The scholarly argument has therefore mainly concerned the time period in which the Military Revolution is supposed to have taken place. None of the above mentioned scholars has tackled the concept per se.

Harold Dorn summarized the aim of the theory by stating that this theoretical concept “is primarily an attempt to account for the formation of the centralized nation-states of Europe by directing attention to the

<sup>27</sup> Ibid., 213–214.

<sup>28</sup> Anirudh Deshpande, “Limitations of Military Technology: Naval Warfare on the West Coast, 1650-1800,” *Economic and Political Weekly* 27:17 (1992), 901.

<sup>29</sup> Geoffrey Parker, *The Military Revolution: Military Innovation and the Rise of the West, 1500-1800* (Cambridge: Cambridge University Press, 1988), 1–2.

<sup>30</sup> Jeremy Black, *A Military Revolution? Military Change and European Society, 1550-1800* (London: Macmillan, 1991).

enormous costs and financial burdens associated with gunpowder weapons and the defensive systems they entailed, costs and burdens that only a politically centralized state could shoulder”<sup>31</sup>; but we will show later that this is not always exactly the chronological order in which military process took place. It might be true, to follow Michael Duffy, that “armed forces and state power ... were inseparably connected in early modern Europe,”<sup>32</sup> but the administrative structures that were needed to exert stable control by the state over its military were not established in a short but rather a long and evolutionary process.<sup>33</sup> This process also forced the state to find funding options for military developments, a factor that also stimulated colonialism as a method to create a financial surplus. While there definitely might have been a stronger centralization in Europe that was related to the growth of armies,<sup>34</sup> it remains open whether military developments were the cause or the consequence. Since we are arguing for an evolutionary model, we lay emphasis on the consideration that both processes were related to each other, but more in a linked than a causative relationship. Gunpowder as well as the *trace italienne*<sup>35</sup> were technologies that were changing, but this took place in combination with political changes. In addition, without a war or the threat of losing against a possible enemy, the states would have never needed to increase their efforts to modernize and centralize the armies. Since such threats are neither solely early modern nor solely related to Europe, the concept of a Military Revolution seems outdated and unsuitable for a modern and global view on events.

We are not the first historians to criticize Parker’s theory; however, we are not only criticizing his position and chronological assumptions but demanding a total abolition of the theory of a Military Revolution, thus pushing the criticism to a new theoretical level. John Stone already pointed out the fact that “Parker’s thesis is so elegant, [and] it does cast

<sup>31</sup> Harold Dorn, “The ‘Military Revolution’: Military History or History of Europe?” *Technology and Culture* 32:3 (1991), 656.

<sup>32</sup> Michael Duffy, ed., *The Military Revolution and the State 1500-1800* (Exeter: University of Exeter Press, 1980), 7.

<sup>33</sup> Paul Kennedy, *The Rise and Fall of the Great Powers* (New York: Random House, 1987), 56.

<sup>34</sup> William McNeill, *The Pursuit of Power: Technology, Armed Force, and Society since A.D. 1000* (Chicago: Chicago University Press, 1982), 80 and 95.

<sup>35</sup> John Rigby Hale, “The Early Development of the Bastion: An Italian Chronology, c.1450 - c.1534,” in *Europe in the Later Middle Ages*, ed. John Rigby Hale, John Roger Loxdale Highfield, and Beryl Smalley (London: Northwestern University Press, 1965), 466–494.

an unfortunate aura of technology-induced inevitability around the events which comprise his Military Revolution and appears to leave no real space for the influence of human agency or contingent events in the matter.”<sup>36</sup> Despite this valuable point, Stone argues that “we are left with an explanation of how, but not why, the Military Revolution occurred.”<sup>37</sup> Thus he raises some valid points but does not go far enough in his criticism of the Military Revolution as a theoretical concept. Mahinder S. Kingra has also written of a “misuse of the concept”<sup>38</sup> by Parker, instead of questioning the suitability of the concept itself.

No doubt, the *trace italienne* is an essential point in the debate over Military Revolutions since it seems to establish a rather exact starting period for the changes in the European militaries. It “reestablished and further entrenched the supremacy of defensive structures in European warfare which gunpowder weapons had temporarily undermined.”<sup>39</sup> But precisely for this reason it has to be seen as a technological approach to overcoming an existing military disadvantage. It was the evolutionary answer to the threat of gunpowder technology. As usual for technological progress in history, it demanded the exploitation of new and thus-far unused resources. The governments of France, Italy, the Netherlands, and Spain consequently had to react if they were not willing to risk a military disadvantage. The consequence was an early modern arms race, which also led to an expansion that was created by the need to increase the income of the states to finance military progress. This scope of progress was narrowed by Parker, whose approach is limited and, therefore, was also criticized for its determinism.<sup>40</sup> To quote Mahinder S. Kingra once again, “Fortresses in the *trace italienne* style were components of ongoing strategic operations,

<sup>36</sup> John Stone, “Technology, Society, and the Infantry Revolution of the Fourteenth Century,” *The Journal of Military History* 68:2 (2004), 366.

<sup>37</sup> *Ibid.*, 366.

<sup>38</sup> Mahinder S. Kingra, “The Trace Italienne and the Military Revolution During the Eighty Years’ War, 1567-1648,” *The Journal of Military History*, 57:3 (1993), 431.

<sup>39</sup> *Ibid.*, 434.

<sup>40</sup> See Simon Adams, “Tactics or Politics? ‘The Military Revolution’ and the Hapsburg Hegemony, 1525-1648,” in *Tools of War: Instruments, Ideas, and Institutions of Warfare, 1445-1871*, ed. John A. Lynn (Urbana: University of Illinois Press, 1990), 28-52; Jeremy Black, *A Military Revolution? Military Change and European Society, 1550-1800* (London: Macmillan, 1991); Bert Hall and Kelly DeVries, “The ‘Military Revolution’ Revisited,” *Technology and Culture* 31 (1990), 500-507; John A. Lynn, “The Trace Italienne and the Growth of Armies: The French Case,” *Journal of Military History* 55 (1991), 297-330.

and not independent variables as Parker suggested.”<sup>41</sup> As we will show in detail below, the *trace italienne* was just one technology of the early modern arms race. It was extraordinary, but not solely decisive.

The answer of the critics was based on the assumption that there was not a single Military Revolution. Clifford Rogers tried to underline this through a close examination of the development of European infantry in the Hundred Years’ War.<sup>42</sup> The rise of the infantry was a reaction to the threat of cavalries just as the *trace italienne* answered the menace of new artillery technologies. Despite his very valuable analysis of the Hundred Years’ War, Rogers seems not to have been able to drive his approach as far as needed: to the end of the myth of a Military Revolution.

Next to the critics of Parker are scholars who have tried to offer alternatives to the theory of a Military Revolution. The establishment of European colonial rule around the world seems, paradoxically, a particularly potent challenge to the concept. Philip T. Hoffmann tried to explain Europe’s advantage by focusing on the use of violence. He argues that

The states of western Europe were simply better at making and using artillery, firearms, fortifications, and armed ships than other advanced parts of the world and they had developed the fiscal and organizational systems that armies and navies equipped with this technology required. The Europeans had this advantage long before 1800. By then, they had conquered some 35 per cent of the globe, and they controlled lucrative trade routes as far away as Asia.<sup>43</sup>

Consequently it would be the experience of war itself that stimulated the developments leading to European supremacy. This assumption already points in the direction of our basic factor behind military progress: a menace. Without the need to beat an enemy, military progress is not affected by the state. By analyzing global examples in the next chapter we will show exactly why some military sectors stagnated while others were improved by steady research and development. To simplify the argument: war creates better warriors, tactics and weapons.

Andrew F. Krepinevich used this simple interrelation to create a much more inflationary definition of a military revolution: “It is what occurs

<sup>41</sup> Mahinder, *Trace Italienne*, 442–36.

<sup>42</sup> Rogers, *Military Revolutions*.

<sup>43</sup> Philip T. Hoffmann, “Prices, the Military Revolution, and Western Europe’s Comparative Advantage in Violence,” *The Economic History Review* 64:1 (2011), 39.

when the application of new technology into a significant number of military systems combines with innovative operational concepts and organizational adaption in a way that fundamentally alter the character and conduct of conflict.”<sup>44</sup> While Krepinevich also highlights the ability of a military threat to influence developmental progress,<sup>45</sup> he totally misuses the term “revolution” in his approach. If we would adopt his idea, human history would consist of one military revolution after another, all laid out in a row since the very first conflicts appeared, and not only the ten he is willing to identify.<sup>46</sup> These ideas about the Military Revolution and the associated criticism, as well as the theoretical adaptations that are proposed, are not sufficient. They do not suffice to make the obvious visible: There never was a Military Revolution.

Since most inventions are not spontaneous but usually mark the end of a long process of research and development,<sup>47</sup> they rarely seemed to be revolutionary in ancient times. However, a process of development is traceable through all ages<sup>48</sup> because ingenious humans have always been in search of a more efficient way of killing without being killed. A new technology that could be used for a military need therefore had to be defensive and offensive at the same time, and to as high a degree as possible: kill without being killed, longer ranges, less contact with the enemy, higher precision and grades of destructiveness, and so on. Technology has therefore been used simultaneously to create a higher grade of both firepower and mobility.<sup>49</sup> As a consequence of the increase in these two factors, killing has become a more and more distant act,<sup>50</sup> in which machine guns, artillery, and tanks have played a decisive role since the age of the two World Wars. The German historian Karl Heinz Metz finally linked all the factors responsible for effective warfare in a simple formula: “if the modern violence of war receives its impact from revolutionary ideologies,

<sup>44</sup> Andrew F. Krepinevich, “Cavalry to Computer: The Pattern of Military Revolutions,” *The National Interest* 37 (1994), 30.

<sup>45</sup> *Ibid.*, 30–31.

<sup>46</sup> *Ibid.*, 31–36.

<sup>47</sup> Kurt Möser, *Fahren und Fliegen in Krieg und Frieden. Kulturen individueller Mobilitätsmaschinen 1880-1930* (Heidelberg: Verlag Regionalkultur, 2009), 12.

<sup>48</sup> For a detailed analysis of the interrelationship of war and technology see the forthcoming book, *The Means to Kill*, ed. Frank Jacob and Gerrit Dworok (Jefferson, NC: McFarland, 2016).

<sup>49</sup> Möser, *Fahren*, 481.

<sup>50</sup> Karl Heinz Metz, *Geschichte der Gewalt* (Darmstadt: Wissenschaftliche Buchgesellschaft, 2010), 116.

her material impact is provided by a network of industrial mass production, industrial transport systems, and purposeful innovation by applied science.”<sup>51</sup> Industrialization also meant industrializing the act of killing, a fact that is underlined by the increased demand for firepower and bullets in the course of the Great War. If we would use the concept of a Military Revolution for modern history as well, we could find numerous examples where a new technology and its military use forced the state to take over its production and to organize the ever larger armies that were using the technology in question.

In the year 1914 alone the German army required the same number of bullets they had fired during the whole war against the French in 1870/71, and the amount continued to climb year by year to the exorbitant numbers of 1918. The events in Europe at the beginning of the twentieth century clearly revealed the impact of science and technology on modern warfare.<sup>52</sup> Although the First World War had a tremendous effect on the social, political, economic, and technological environments of the participating powers, it is not what is discussed when historians talk about the Military Revolution. What Geoffrey Parker defined as a Military Revolution had been the reason for Western supremacy since the early modern period of European history, which was mainly determined by exploration, expansion, and the beginning of colonialism. Following Parker, this supremacy was based on superior Western military power expressed by modern siege cannons, new forts that followed the design of the *trace italienne*, larger infantries, an expanded administration with a rather complex tax system, and, finally, cannons mounted on ships that could establish as well as support oversea forts.<sup>53</sup> Following his theory, the military development in Europe during the late Middle Ages and the Early Modern era was unique, and explained the continuous Western supremacy in the age of colonialism and imperialism.<sup>54</sup> We will show not only that the European developments

<sup>51</sup> Ibid., 118.

<sup>52</sup> Ibid., 123.

<sup>53</sup> Geoffrey Parker, *The Military Revolution: Military Innovation and the Rise of the West*, Cambridge, Cambridge University Press, 1996). On the importance of forts see Geoffrey Parker, “The Artillery Fortress as an Engine of European Overseas Expansion 1480-1750,” in *City Walls: The Urban Enceinte in Global Perspective*, ed. J. Tracy (Cambridge, Cambridge University Press, 2000), 386–416.

<sup>54</sup> Tonio Andrade, Kang Hyeok Hweon and Kirsten Cooper, “A Korean Military Revolution? Parallel Military Innovations in East Asia and Europe,” *Journal of World History* 25:1 (2014), 52.

were not unique, but also that the developments themselves were everything but revolutionary.

Even though Parker's theory was criticized for its teleological approach,<sup>55</sup> aiming as it did to explain the whole history of the following centuries, the debate as stated above focused mainly on the nature of the revolution<sup>56</sup> as well as its chronology.<sup>57</sup> Despite the heat of the discussion itself, it very often neglected the non-Western world,<sup>58</sup> even though Europe did not always dominate the military scene in Africa,<sup>59</sup> Asia,<sup>60</sup> or the Americas. The discussion seemed rather one-sided, even though historians who were familiar with non-European spheres did begin to criticize its Eurocentric conceptions. As a consequence, it seems to be useful to scrutinize the theory of a Military Revolution in general. To prove that there never was a Military Revolution, we will try to answer three questions that will help to raise critical arguments against the use of the concept of revolution in military history in general. We ask: Were there global events comparable to the concept of the Military Revolution? Were there numerous revolutions in human history, and if so, why should we use the concept of a revolution at all? And finally, is the process of research and development in military history endless, and do we really have to use a better concept to describe the military changes that have occurred throughout the ages?

<sup>55</sup> Jeremy Black, *Beyond the Military Revolution: War in the Seventeenth-Century World*, (New York: Palgrave Macmillan, 2011).

<sup>56</sup> Clifford J. Rogers, ed. *The Military Revolution Debate: Readings on the Military Transformation of Early Modern Europe* (Boulder: Westview Press, 1995).

<sup>57</sup> Andrew Ayton and J. L. Price, *The Medieval Military Revolution: State, Society and Military Change in Medieval and Early Modern Europe* (London, I.B. Tauris, 1995); David Etlis, *The Military Revolution in Sixteenth-Century Europe* (London, I.B. Tauris, 1995).

<sup>58</sup> Andrade, Korean Military Revolution, 52.

<sup>59</sup> One example would be the Battle of Adwa in 1896. For a detailed study of this battle see: Raymond Jonas, *The Battle of Adwa: African Victory in the Age of Empire* (Cambridge, MA, Belknap Press, 2011).

<sup>60</sup> Tonio Andrade, *Lost Colony: The Untold Story of China's First Great Victory over the West* (Princeton: Princeton University Press, 2011).

## Global Military Revolutions?

**Abstract** The premise that a Military Revolution impelled European powers into an era of global hegemony during the Early Modern period is not supported by contemporary events. The conquest of Mexico and Peru, the two most important colonial acquisitions by a European state during that era, were accomplished without the application of the technology or tactics that are usually associated with the Military Revolution. On the other hand, Japan, Korea, some Indian states, and the Ottoman Empire implemented military reforms, both tactical and technological, that are commonly associated with what was considered an exclusively Western approach to warfare.

**Keywords** Conquistadors • Early modern Japan • Gunpowder revolution

The theory of a Military Revolution as introduced by Roberts and Parker is based on an entirely European perspective. While there are already points to criticize when one focuses only on European history, the weakness of the concept itself becomes striking when one starts to compare the events of early modern Europe with those events that happened outside the Eurocentric enclave. The European powers, it is true, were able to establish colonialism and conquer large parts of the world; however, the supremacy of the West is not easy to explain. It was not only military

advantage that would lead to European rule over the world. In many cases this explanation would be far too simple and totally omits the contexts of the colonial world. Internal struggles, political declines, economic problems, and other factors seemed for a long time to play no role, given that military historians stated that new fortresses and guns were sufficient to rule the whole world. William R. Thompson criticized the idea of Western superiority, showing that target vulnerability and local allies are at least as important as military superiority, if not more so. If it can also be demonstrated that in some cases the military superiority exhibited by the Europeans was not due to early modern revolutions in military technology, the military superiority interpretation will have been shown to require even further discounting. Finally, an emphasis on one side's coercive edge in acquiring territorial control tends to overlook the macroevolution of a global political economy increasingly dominated by some Western Europeans. Ultimately, this macroevolution is a more important key to the finite ascendancy of the European region within the world economy than is military superiority.<sup>1</sup>

Thompson compares the expansion of the Portuguese, the conquest of the Aztec and Incan Empires, the establishment of Dutch colonial rule in Indonesia, and the British rule in India to prove his point. Military superiority has been overestimated for far too long, without taking into consideration the local element that was also responsible for the establishment of colonial rule in the named territories.<sup>2</sup>

It is also important to block needless and unprovable generalizations when explaining the so called "rise of the West." Africa, the Americas, and Asia are different regions, with different circumstances and a different cultural geography. External factors like diseases might have played a role in the European occupation of Latin America, but they did not in the establishment of colonial rule in Asia.<sup>3</sup>

Sea power was a reason for the Portuguese success in taking over the Arabian trade routes of the Indian Ocean and the establishment of the

<sup>1</sup>William R. Thompson, "The Military Superiority Thesis and the Ascendancy of Western Eurasia in the World System," *Journal of World History* 10:1 (1999), 144.

<sup>2</sup>Ibid., 178.

<sup>3</sup>George Raudzens, "Military Revolution or Maritime Evolution? Military Superiorities or Transportation Advantages as Main Causes of European Colonial Conquests to 1788," *The Journal of Military History* 63:3 (1999), 632.

Dutch colonial empire in Southeast Asia,<sup>4</sup> but for the conquistadors who conquered the Americas, sea power played a lesser role. They benefited rather from diseases, internal conflicts, and the strategic and diplomatic abilities of their commanders. It is also doubtful that the military changes in Europe could be successfully deployed in a colonial setting just a few years after the introduction of the new technology at home. If we consider the timing of when some European powers established colonial rule, the transmission of the military technologies seems to have lasted centuries, a fact that would also support the idea of an evolutionary process of research and development instead of a Military Revolution.<sup>5</sup> The combination of sea power and gunpowder-based artillery made the Portuguese traders successful in taking over existing trading routes, but not in taking over the colony itself. Formal colonial rule was established much later, something we have to have in mind for many spheres in which European powers would dominate in later times.

When the colonial empires were created, especially the colonies of mastery and base colonies, the local elites were usually left in place, provided they accepted foreign rule. Therefore the advantage of the European colonizers might have also been the use of Machiavellian ideas:

when those who fight are of such a character that you have no anxiety as to who may conquer, so much the more is it greater prudence to be allied, because you assist at the destruction of one by the aid of another who, if he had been wise, would have saved him; and conquering, as it is impossible that he should not with your assistance, he remains at your discretion. And here it is to be noted that a prince ought to take care never to make an alliance with one more powerful than himself for the purpose of attacking others, unless necessity compels him, as is said above; because if he conquers you are at his discretion, and princes ought to avoid as much as possible being at the discretion of any one.<sup>6</sup>

<sup>4</sup>See Carlo M. Cipolla, *Guns and Sails in the Early Phase of European Expansion, 1400–1700* (London: Collins, 1965); J. H. Parry, *The Spanish Seaborne Empire* (London: Hutchinson, 1966); Geoffrey V. Scammell, *The World Encompassed: The First European Maritime Empires, c. 800–1650* (Berkeley and Los Angeles: University of California Press, 1981).

<sup>5</sup>George Raudzens, “Military Revolution or Maritime Evolution? Military Superiorities or Transportation Advantages as Main Causes of European Colonial Conquests to 1788,” *The Journal of Military History* 63:3 (1999), 635.

<sup>6</sup>Niccolo Machiavelli, *The Prince*, Ch. 21, <http://www.gutenberg.org/files/1232/1232-h/1232-h.htm#link2HCH0021> (last access, November 16, 2015).

In many cases of colonial expansion and domination the European forces were relying on such alliances.<sup>7</sup> It was seldom that the invading forces were a majority on the battlefield. In many cases already existing rivalries were used to achieve the the goals of colonizers hoping to achieve a superior position, for example by outnumbering the opponents, during or after the ongoing campaigns.<sup>8</sup>

Historians like Tonio Andrade, who has a non-European focus and a global perspective, have therefore urged a closer look at the colonial settings to better understand the events that led to Western supremacy in the so-called colonial world. He argues that a Military Revolution took place in the 1300s in China and he analyzes the Sino-Dutch War (1661–1668) to show that military development in Asia was not stagnant at all.<sup>9</sup> Thus the revisionists of world history want to get away from the Eurocentric way of writing it, since, as Jack Goldstone underlines, the European invaders had no real military advantage when they started their invasion, but were rather using already existing internal tensions to gain the upper hand.<sup>10</sup> In the debate on world history, however, both parties use Parker’s concept.<sup>11</sup> While the defenders of European supremacy use it to explain the success in establishing colonial rule,<sup>12</sup> critics use it to find similarities with regard to military progress in the colonial world. We propose that both should start their discussions again, free of the concept of a Military Revolution, which is outdated quite apart from its questionable Eurocentric origins.

Recent studies from young scholars of military history in the non-European context will help us to understand the developments better, especially if they use our proposed concept of a military evolution with peaks of development in cases of an actual existing menace. In Asia, the Chinese, as shown by Sun Laichen,<sup>13</sup> as well as the Japanese, as will be

<sup>7</sup> Raudzens, *Maritime Evolution*, 637.

<sup>8</sup> *Ibid.*, 641.

<sup>9</sup> Tonio Andrade, “An Accelerating Divergence? The Revisionist Model of World History and the Question of Eurasian Military Parity: Data from East Asia,” *The Canadian Journal of Sociology* 36:2 (2011), 185–208.

<sup>10</sup> Jack Goldstone, “Capitalist Origins, the Advent of Modernity, and Coherent Explanation: A Response to Joseph M. Bryant,” *Canadian Journal of Sociology* 33:1 (2008), 128.

<sup>11</sup> Andrade, *Divergence*, 188.

<sup>12</sup> Joseph M. Bryant, “A New Sociology for a New History? Further Critical Thoughts on the Eurasian Similarity and Great Divergence Theses,” *Canadian Journal of Sociology* 33:1 (2008), 149–167.

<sup>13</sup> Sun Laichen, “Ming-Southeast Asian Overland Interactions, 1368-1644” (Ph.D. Thesis University of Michigan, 2000).

shown later, had the opportunity to counter the European threat. Those scholars who are in favor of the idea of European dominance would argue that the fact that Japan and China were able to resist is simply a consequence of the import of European technology in the previous years. However, the weapons that were used in the early seventeenth century were not the same as those that had previously been imported by the Asian powers. The need to use them in large campaigns in Asia had made the rulers invest in research and development to make them more effective.<sup>14</sup> One cannot just speak of a copy of European technology. It was far more than that. Another point that would help to counter this Eurocentric argument is the fact that gunpowder was also introduced from Asia to Europe and not vice versa. Following the logic of the Eurocentric scholars, this would establish Asian military supremacy long before the Europeans began to think of their own Military Revolutions.

Even though he is still in favor of a model that includes the Military Revolution concept, Andrade therefore correctly concludes:

the Chinese Military Revolution theorists don't deny that European guns became more effective after 1500 or so. They just advocate for a larger view of the issue. The military revolution, they say, must be viewed as a Eurasia-wide phenomenon, one that began in China and redounded throughout the world. When the new technologies reached the fractious and warlike states of Europe, Europeans took them up rapidly and then brought them back to East Asia, honed through a couple centuries of violent warfare, to be just-as-eagerly taken up in Japan, Korea, and China. The picture the Chinese Military Revolution school paints, based on painstaking and careful research, supports the revisionists' perspective: many developed parts of Eurasia were progressing along lines quite similar to those in Europe.<sup>15</sup>

Andrade's analysis of the Sino-Dutch War might show that the success of the Dutch was based on their ships and the new fortresses following the basic concept of the *tracce italiana*, but we would disagree that these facts comprise an argument for the theory of the "rise of the West" being

<sup>14</sup>For China: Andrade, *Divergence*, 189–190. For Japan: Kenneth Swope, "Crouching Tigers, Secret Weapons: Military Technology Employed During the Sino-Japanese-Korean War, 1592–1598," *The Journal of Military History* 69:1 (2005), 11–41. On the transfer of military technologies in Asia see: Sun Laichen, "Military Technology Transfers from Ming China and the Emergence of Northern Mainland Southeast Asia (c. 1390–1527)," *Journal of Southeast Asia Studies* 34:3 (2003), 495–517.

<sup>15</sup>Andrade, *Divergence*, 190.

a consequence of the Military Revolution. Koxinga's soldiers had already adopted European drill and fighting styles. The introduction of a new technology would have automatically led to a technological menace, creating further developments on his side in the future. However, supplies and political stability were in favor of the Dutch. It is a pity that Andrade stuck with the idea of a Military Revolution, even if he concluded that "We can instead view both Asian and European societies as progressing along similar lines, towards greater specialization, greater commercialization, more effective agricultural techniques, more effective military technology, and so on, but with European societies beginning to progress slightly more quickly, at least in certain areas."<sup>16</sup> Political stability might have played a much larger role than the technology itself, another point that underlines that between the technological and the political factors there is not simply a causative relationship.

Considering that "the limit of human technology is the range of its need,"<sup>17</sup> the human need is to kill other people to survive, expand, or rule. To expand their rule the European great powers had to adopt the technologies their own enemies already possessed. The effect was a change in political and economic structures, but these were also needed to create the change itself. The organic and evolutionary interrelation between the two factors also led to expansion in order to gain further financial superiority. This would be needed in the future for technological advantage in the early modern arms race. This need, which is not early modern but human in general, has determined the use of political, economic, social, and technological resources to achieve this aim since humanity came into existence. Due to this process, technology has also always been able to provide a concept of a future. So-called hard technology of tools and soft technology of its use<sup>18</sup> became an essential part of the history of mankind in any age, no matter which region of the globe. Some examples from the non-Western world will suffice to show that this process is a very generalized tendency; therefore, the adoption of modern technologies is nothing that could be described as uniquely European.

In the following pages we will therefore offer some global examples that help to further explain our argument for the abolition of the theoretical concept of a Military Revolution. First of all, it seems important to mention that

<sup>16</sup> Ibid., 202.

<sup>17</sup> Karl Heinz Metz, *Ursprünge der Zukunft. Die Geschichte der Technik in der westlichen Zivilisation* (Paderborn: Ferdinand Schöningh, 2006), 12.

<sup>18</sup> Ibid., 16.

even in the early modern period not every military expansion was successful. The Portuguese occupation of the coastal areas of Morocco established a task for the noblemen, from the early fifteenth to the mid-sixteenth century, aiming to check the rise of Islam on Europe's flank in order to protect the Iberian Peninsula. The Spanish established garrison cities in the region, and conducted a form of marauding war against the villages of the Moorish population around their forts. However, united resistance against the European occupier in the region led to a decline of Portuguese standing. The forts were eventually abandoned, and by the middle of the sixteenth century just three fortresses were left under Portuguese control: Ceuta, Mazagão (El Jadida), and Tangier.<sup>19</sup> Geographical factors as well as the existence of a united resistance against the occupiers ended the rule of a European power in the region, but this is not the only example that shows that supremacy in the non-European world could not always be defended or gained solely by the possession of better technologies.

As we have already mentioned, a crucial element of Parker's theory is the notion that the Military Revolution spread overseas and led directly to Western European hegemony over the rest of the world. According to Parker, by 1650 "the West had already achieved mastery in four separate areas: Central and Northeast America; Siberia; some coastal areas of sub-Saharan Africa; and the islands of South East Asia."<sup>20</sup> These territorial acquisitions (in particular the Spanish conquest of the Aztec and Inca empires) would represent the triumph of the Military Revolution abroad. However, upon close examination one can see that the acquisition of an overseas empire by Castile in the sixteenth century is in many ways a medieval military enterprise. An analysis of the conquests of Mexico and Peru shows the employment of traditional tactics and weaponry rather than the implementation of a revolutionary vision that relies on new infantry formations, the building of fortresses "in the fashion of the Italians," and firearms technology. In fact, the conquests of Mexico, Peru, and other regions in the Americas follow the pattern that we see for the first time during the conquest of the Canary Islands, an event that is itself the adaptation of practices developed during the Christian re-conquest of the Iberian Peninsula.

<sup>19</sup>Pedro de Brito, "Knights, Squires and Foot Soldiers in Portugal during the Sixteenth-Century Military Revolution," *Mediterranean Studies* 17 (2008), 119.

<sup>20</sup>Parker, *Rise of the West* (1996), 117. Parker left out the Caribbean, southern North America, and the whole South American continent.

The Canary Islands were discovered in the fourteenth century, and over the course of decades were raided by Portuguese, Catalan, Genoese, and Castilian adventurers searching for slaves. The first organized effort to conquer the archipelago took place in 1402. A Norman nobleman by the name of Jean De Bethencourt obtained a license to conquer the islands in the name of the king of Castile.<sup>21</sup> By 1405 Bethencourt had conquered three of the islands (Lanzarote, Fuerteventura, and Hierro), had baptized the local inhabitants (the culturally isolated Guanche people), and established a Catholic diocese.<sup>22</sup> Bethencourt sold his rights over the islands in 1418 to the Castilian Duke of Niebla.<sup>23</sup> By 1445 the fiefdom had passed to the Peraza family, and the island of La Gomera had been peacefully incorporated into their domain. However, taking control of the remaining three islands proved to be a more daunting task. Resistance by the Guanches was fierce and effective, even though they had Stone Age technology and a primitive political organization. By 1477 it became evident that conquering the bigger islands required greater economic and military resources. The right of conquest reverted to the Castilian Crown, and an expedition against the native-controlled islands was launched the same year. The conquest and pacification of the Canary Islands was not concluded until 1496.

There are not many extant details about the nature of combat in the Canary Islands during the Bethencourt conquest, but we have more information about the period of the Royal expeditions. The attack against Gran Canaria was initiated by 600 Castilians under the command of Juan Rejón.<sup>24</sup> In a confrontation with about 2000 natives, Rejón inflicted hundreds of casualties on his enemies while only sustaining seven dead and twenty-six wounded. The key to his victory was the cavalry charge.<sup>25</sup>

<sup>21</sup> Over the course of the Reconquista, Iberian rulers depended on the entrepreneurial spirit and economic resources of their retainers to conquer lands from the Muslims. Usually a "cédula" was issued to an individual who would finance and organize an expedition against a specific territory. The document specified whether the individual could raid, conquer, and/or settle the lands in question. With the advent of overseas exploration, cédulas were also issued for the discovery of new lands and trading with the natives.

<sup>22</sup> J. Abreu Galindo, *Historia de la Conquista de las Siete Islas de la Gran Canaria*, (Santa Cruz de Tenerife: Imprenta, Lithografía y Librería Isleña, 1848), 1, VIII–IX.

<sup>23</sup> *Ibid.*, 1, XXII.

<sup>24</sup> *Ibid.*, 2, IX. According to the *Crónica Ovetense*, Rejón also counted with 30 horsemen. See *Crónica Ovetense*, VIII in Francisco Morales Padron, ed. *Canarias: Crónicas de la Conquista*, (Las Palmas de Gran Canaria: Museo Canario, 1978).

<sup>25</sup> *Ibid.*, 2, X.

We also learn that in a subsequent campaign on the island of Gran Canaria, the Castilian contingent consisted of 300 crossbowmen and 55 horsemen. This combination appears to have been quite effective in combat, but in a situation where the crossbowmen initiated an action against a Canarian position without cavalry support, the Castilians suffered 50 casualties.<sup>26</sup>

After the death of Rejón, the Catholic kings dispatched Alfonso Fernández de Lugo to finish the conquest of the last remaining islands in 1494. Lugo counted on a force of 900 infantrymen and 140 cavalry.<sup>27</sup> The conquest of Tenerife would prove very costly to the Spaniards. As the forces of Lugo proceeded through narrow ravines towards the center of the island, they were ambushed by a great number of Guanches led by chiefs Bencomo and Tinguaro. Taking advantage of the terrain, and under the cover of thick brush, the natives attacked Lugo's troops at a place called Acentejo. A force of 300 carefully selected men under chief Tinguaro blocked a narrow pass in Spartan fashion, while chief Bencomo, with a large force, attacked the Castilian column from the rear. The horses, which had been so effective on previous encounters, were unable to maneuver on the steep and narrow ravine. The Spaniards lost at least 500 men, along with 300 Canarian allies.<sup>28</sup> Lugo survived the battle, and eventually returned to the island with reinforcements a few months later.<sup>29</sup> When Bencomo confronted Lugo on an open field at the battle of Aguere, the Spaniards had the advantage. The battle started with a salvo of firearms and crossbows. The Castilian infantry closed ranks, and the cavalry charged. The Guanches were decisively defeated by the Castilian army.<sup>30</sup>

As we read the chronicles of the latter part of the Canarian conquest, a clear pattern emerges in terms of tactics. This was a war of raids and counter-raids. There were guerilla attacks on the part of the natives and punitive expeditions (against the local population) on the part of the Spaniards. There were only a few encounters that involved large numbers of combatants. In addition to Castilian soldiers, the Spanish commanders

<sup>26</sup> Ibid., 2, XXIV.

<sup>27</sup> Antonio de Cedeño, "Breve Resumen y Historia Muy Verdadera de la Conquista de Canaria," in *Canarias: Crónicas de la Conquista*, ed. Francisco Morales Padron (Las Palmas de Gran Canaria: Museo Canario, 1978), XX, 443.

<sup>28</sup> Ibid., XX, 449.

<sup>29</sup> Lugo received significant financial support from Sevillian merchants, and the Duke of Medina sent him 650 foot soldiers along with 40 mounted men. Abreu, 3, XIX.

<sup>30</sup> Cedeño, XX, 452.

counted the support of local allies, Guanches who had submitted willingly to Spanish rule or had been subjugated by force of arms a few decades before. Against the disorganized masses of fierce tribesmen armed with spears and very accurate (and lethal) slingshots, the Castilians relied on the defensive tactics of their infantry, the offensive power of crossbows, and the mobility and shock of their cavalry. Firearms were utilized but only on a small scale, and they do not seem to have had a significant impact on the military outcome in any battle. The conquest of the Canary Islands was a medieval enterprise in terms of purpose, in terms of process, and in terms of military tactics and weaponry. But the campaign was also Castile's first venture into modernity, the first step towards a century of global hegemony. The Canaries campaign would also provide the blueprint for the conquest and settlement of the new world that Columbus would discover only five years after the fall of Tenerife.

Between 1492 and 1519 Castile took possession of the large Caribbean islands (Hispaniola, Cuba, Puerto Rico and Jamaica) and established a firm foothold on both coasts of the Panamanian Isthmus. The native populations that Spain encountered in these regions were organized into chiefdoms of varying degrees of size and military capabilities. While often led by valiant leaders, these chiefdoms were limited by their primitive weapons technology and lack of military organization. Their weapons were mainly spears, maces, and bows and arrows of limited lethality from the perspective of organized combat. A great number of these natives submitted to the Castilians without resistance and were soon decimated by Old World diseases. During this stage of the conquest, the main enemies of the Europeans were the geographic conditions and the unhealthy climate. One can imagine the medieval army of Jean de Bethencourt accomplishing as much as the soldiers of Diego de Velázquez in Cuba or the forces of Pedrarias Dávila in Panama.

The conquests of Mexico and Peru would be a very different affair. The scale of these two military enterprises and their impact upon world history are qualitatively different from what the Spaniards had accomplished before. The conquest of the Aztec and Inca empires would become the first clear evidence of the global hegemony of the West. And yet upon close examination these two military events do not fit into the theoretical framework of the Military Revolution. The conception of the enterprise is an extension of the crusader spirit of the Reconquista; the military organization follows the pattern of Castilian settlement of Muslim lands in Iberia; the tactics are improvised versions of operational patterns learned

during the struggle against the kingdom of Granada (the last Muslim state in the Iberian peninsula); the technology is medieval (except for a handful of firearms); and the legal framework of the conquest (the political justification) was also medieval in nature, with religious conversion playing a prominent role.

In 1519 Hernando Cortés landed in Mexico with an army of 550 men along with seventeen horses.<sup>31</sup> Within two years, with the addition of around a thousand more conquistadors, Cortés obliterated one of the largest and most populous empires in the world. While technology and tactics played an important role in Cortés's victory, his army lacked the characteristics that we would identify with the changes that were taking place on the European battlefields and that are often associated with the Military Revolution.

Bernard Grumberg has conducted a study of 1175 individuals who fought during the conquest of Mexico (out of a total that he calculates at 2100).<sup>32</sup> Grumberg's analysis shows that only 69 of the men in his sample were hidalgos, that is, men of noble origin (and consequently with some degree of military training). Only 16% of those whose occupation he was able to identify were professional soldiers prior to their arrival in the Americas. It is not clear where, how long, or in what capacity they had served. Therefore, we can infer that a significant number of the conquistadors lacked formal military training or extensive combat experience. That includes Cortés, a member of a hidalgo family who had entertained the idea of a career in law before sailing to the new world. This means that Cortés and a significant number of his men were not familiar with the tactics of the Italian Wars, the putative laboratory of the Military Revolution.

In terms of armament, Cortés's army was not constituted like the Castilian formations fighting in Europe, in particular Italy and the Roussillon. The Castilian force consisted mainly of infantry divided into men with sword and buckler, men with spears, and men with crossbows. There were few men armed with firearms. The artillery consisted of ten bronze pieces and "a few" falconets (light cannon), and his mounted contingent comprised seventeen horses.<sup>33</sup> Cortés's army more than

<sup>31</sup> Bernal Díaz del Castillo, *Historia Verdadera de la Conquista de la Nueva España*, (Mexico, D.F.: Editorial Porrúa, 2013), XXIII.

<sup>32</sup> Bernardo Grumberg, "El Universo de los Conquistadores: resultado de una investigación prosopográfica," *Signos Históricos* 12 (2004), 95.

<sup>33</sup> Díaz, XXIII.

doubled in size when the forces of Pánfilo de Narváez were added in April of 1520. The number of horses increased significantly, but the fundamental nature of his force did not change.<sup>34</sup> Cortés was about to conquer an empire of millions of people with an army roughly the size of the one that captured the island of Tenerife.

The expedition to Mexico began as an enterprise of exploration and discovery, with the purpose of establishing trade and perhaps a settlement from which further incursions could be planned. However, as Cortés gathered intelligence about the region he decided to abandon the original mission and proceed with the conquest of the country.<sup>35</sup> With the help of a local translator (the fabled woman Malitzin), Cortés developed a general sense of the political situation in the Aztec empire and proceeded to establish alliances with the local people. Cortés's ability to understand the political dynamics of central Mexico enabled him to develop a strategy that would lead to success. The locals, on their part, understood that the strange-looking newcomers offered them the opportunity to get rid of Aztec dominance, but their fear of the Aztecs made them cautious. When Cortés met with the Totonacs at the city of Cempoala, he knew that he needed to put them in a position that would commit them irrevocably to an alliance. And so, when the Aztec tax collectors arrived in the city, Cortés arrested them, and placed the Totonacs in a position where they had no choice but to join him. As a test of Cortés's commitment to liberate them from Aztec oppression, the Totonacs informed Cortés of an Aztec garrison located in the vicinity of their city. Without hesitation, Cortés sent out a group of men to take control of the stronghold. This is was the first armed encounter between the Spaniards and the Aztec forces.

<sup>34</sup>According to Díaz, the army of Narváez included 1300 soldiers, 200 horsemen and 200 arquebusiers and cross-bowmen (the exact proportion of each is not provided). Díaz also mentions that Narváez's army had eighteen "tiros," unspecified artillery pieces. Díaz, CLXII.

<sup>35</sup>In the medieval tradition of the Reconquista, monarchs issued licenses to private individuals to launch campaigns of exploration, pillaging, conquest, and settlement of Muslim territory. That policy was extended to the Canary Islands and to the New World. Cortés had defied the orders of the governor of Cuba and proceeded with his expedition to Mexico without royal approval or gubernatorial authorization. That is why he established the "city" of Veracruz. This city was little more than a legal fiction in 1519, but its creation (at least in the documents) was essential to legitimizing Cortés' actions and enabling him and his men to enjoy the fruits of their efforts. In the medieval tradition of the Reconquista, the city council of a frontier town could issue cédulas (permits) to individuals to launch attacks against the Muslims. Hernán Cortés, *Cartas de Relación*, ed. M. Hernández Sánchez-Barba (Madrid: Dastin, 2000), 65.

It is here that Cortés and his men took measure of the martial ability of the Aztec foe. The Mexica (Aztec) warriors (like many Mesoamerican armies) were equipped with light armor made of layers of padded cotton<sup>36</sup>; they were armed with shields, bows and arrows, darts thrown by an *atlatl*, slingshots, and *macahuitls* or *macanas* (wooden “swords” with obsidian blades inserted around the edges).<sup>37</sup> The *macanas* were particularly lethal, capable of inflicting massive injuries to a horse. The result of this encounter was a complete rout of the native forces, and the crucial weapon on the Spanish side was the cavalry.

It is important to note that the tactics used by the Aztecs against Cortés during this and subsequent encounters were not the ritualistic combat associated with the fifteenth-century “Flower Wars.” The traditional view is that these wars were military campaigns triggered by the Aztec desire to capture prisoners to be sacrificed to their gods in the face of widespread drought and famine. The combat (whose frequency was determined by astrological calculations) was supposedly highly ceremonial, with warriors simply trying to pin down the enemy or “tagging” them as prisoners who would place themselves out of the battle on the honor system.<sup>38</sup> However, Barry Isaac has pointed out that these military campaigns were more than ritualistic encounters or holy wars. Accounts of several battles between the Aztecs and various enemies (including the Tlaxcalans and the Cholulans) attest to large numbers of warriors killed and wounded during these encounters.<sup>39</sup> In fact, most of the wars waged by the Aztecs since the rise of their empire in 1425 were “traditional” wars, wars of conquest that were no different (in terms of political, strategic, and tactical objectives) from wars waged by other organized states throughout history. When the Aztecs fought with the Spaniards, their primary objective was to kill them and not to capture them.

<sup>36</sup>This garment was called *ichcahuipilli* and was widely used by different ranks of warriors. A more specialized form of armor was *tlabitzli*, a full-body suit that was up to two fingers thick and also made of quilted cotton. Patricia Rieff Anawalt, “What Price Aztec Pageantry?” *Archaeology* 30:4 (1977), 228.

<sup>37</sup>Ibid.

<sup>38</sup>Barry L. Isaac, “Aztec Warfare: Goals and Battlefield Comportment,” *Ethnology* 22:2 (1983), 121.

<sup>39</sup>While casualty numbers are not always reliable in the Mexican ethno-historical sources, they are consistent. The sources claim that the numbers killed in individual battles were in the thousands and that these numbers were either significantly superior or at least equal to the number of sacrificial captives. Barry L. Isaac, “The Aztec Flowery War.” *Journal of Anthropological Research* 39:4 (1983), 421.

After the Spaniards soundly defeated the Aztec garrison near Cempoala, the Totonacs were firmly in Cortés's camp. Obtaining an alliance with the more aggressive Tlaxcalans proved more difficult than with the Totonacs, but ultimately successful. Cortés knew that the Tlaxcalans were sworn enemies of the Aztecs, and their help would be a crucial part of his plans.<sup>40</sup> Tlaxcala had a vast territory with valuable resources, and it was strategically located. The Tlaxcalans could provide thousands of warriors and logistical support to Cortés' army, but the kingdom was divided, and when Cortés sent envoys to announce his peaceful intentions and his desire to liberate the peoples of Mexico from Aztec control, the response of Tlaxcala was war.<sup>41</sup> As Cortés approached the Tlaxcalan capital, a large number of warriors came out and confronted Cortés in at least two engagements. Four hundred Spaniards<sup>42</sup> fought thousands of Tlaxcalan warriors who, according to Díaz, had no intention to capture them for sacrifice but to kill them.<sup>43</sup> During these crucial engagements the infantry packed into a tight formation with artillery and crossbows, trying to put the natives at bay. Since the Tlaxcalans were closely packed together as they charged, they provided rich targets for the Spanish firearms and crossbows.<sup>44</sup> The Spanish formation was close to breaking on several occasions, but in the end the small Spanish cavalry came forward and pushed back the masses of natives. Two horses were killed and two others were injured,<sup>45</sup> but the cavalry charge supported by crossbow fire and the infantry scared the Tlaxcalans and forced their retreat.<sup>46</sup> Following the battle, the Tlaxcalans made peace with Cortés and offered him their support in his march towards

<sup>40</sup>It should be noted that an essential component of Cortés's victory was his ability to assess the political conditions of the place he conquered. Cortés is constantly gathering information from his interpreters Malitzin and Geronimo Aguilar, from his Totonac allies, and from the Aztec envoys. He is drawing a mental blueprint of the complex political relationships that existed in Mexico. His ability to gather intelligence and process it into a dynamic and malleable plan of action is a crucial factor in his eventual success. His military victory was built upon his diplomatic skills.

<sup>41</sup>Díaz, LXIII.

<sup>42</sup>The contingent included at least six pieces of light artillery and five arquebuses, along with forty crossbowmen. Cortés, 98.

<sup>43</sup>This comment by Díaz confirms that the inhabitants of Mexico knew quite well that the purpose of war is the annihilation of the enemy and that their religious beliefs associated with human sacrifice were not a tactical advantage for the Spaniards. Díaz, LXV.

<sup>44</sup>Díaz, LXIII.

<sup>45</sup>Cortés, 97.

<sup>46</sup>Ibid., 65.

the Aztec capital. The Tlaxcalans understood that the Spanish army was tactically superior. They also understood that there was no dishonor in losing to a worthy foe, and that enabled them to establish an alliance with the Spanish conqueror in terms of mutual respect. This alliance would prove the most profitable to Cortés.<sup>47</sup> Tlaxcala provided Cortés with intelligence, thousands of able warriors, and, most importantly, logistical support. The location of Tlaxcala midway between Veracruz, on the coast, and Tenochtitlan, in the central plateau, was also strategically significant.

After resting in Tlaxcala for twenty-one days, Cortés proceeded towards Tenochtitlan. Emperor Moctezuma's indecision and inaction played a crucial role in the demise of his empire. He may have concocted half-hearted plans to stop Cortés,<sup>48</sup> but he hesitated to use the full strength of his military forces to stop the Spaniard's advance. Moctezuma's hesitation may have been fostered by Cortés's approach to conquest. While his use of violence against locals, establishment of a "city," establishment of alliances, and advance through central Mexico were clearly a violation of Aztec sovereignty, Cortés was not formally defying Moctezuma or declaring war on the Aztec state. Cortés was able to create enough ambiguity in his official dealings with the Aztecs to avoid a full-blown confrontation. However, once Moctezuma hesitantly welcomed the Spaniards into the city, the détente could no longer be maintained. Cortés needed to act, but not before confronting another serious threat, the presence of over 1000 men under Pánfilo de Narváez sent to Mexico to arrest the outlaw conquistador.

With only 80 men,<sup>49</sup> Cortés returned to the coast, joined with 300 men he had left behind, and, in a commando-like nocturnal action, took over Narváez's camp and captured the man who came to arrest him. The wounded Narváez was formally arrested along with some of his most loyal men; the rest of the army was persuaded by Cortés to join him in his quest to conquer Mexico. This is significant since the members of the Narváez expedition not only increased the size of his army significantly but also because they brought along a large number of horses.<sup>50</sup>

<sup>47</sup> Ibid., 101.

<sup>48</sup> Cortés and Díaz del Castillo claim that at Cholula the locals had a plan to kill the Spaniards while they were their guests. Allegedly this plan was put in place at the request of the emperor.

<sup>49</sup> Hugh Thomas, *Conquest, Montezuma, Cortés, and the Fall of Old Mexico* (New York: Simon and Schuster, 1993), 369.

<sup>50</sup> At the time that Narvaéz arrived Cortés had only about 560 men left. See: Ibid.

Cortés marched back to the Aztec capital with a force of 500 infantry, 70 horsemen, and all the “artillery” that he could gather.<sup>51</sup> Cortes returned to a Tenochtitlan that was about to explode. During his absence, his lieutenant Pedro de Alvarado had massacred a large number of restless Aztec warriors. Moctezuma had lost the loyalty of his army and his people. After Moctezuma, as reported by the Spanish eyewitnesses, was killed by a rock thrown by one of his own subjects, the situation of the Spaniards and his allies became untenable inside the city, so Cortés decided to attempt a breakout. What followed was Cortés’ only defeat during the conquest, one that almost doomed the mission. Trying to escape from the Aztecs in the middle of the night laden with treasures (mainly gold), the Spaniards tried to make their way across the causeways that connected Tenochtitlan to the shores of lake Texcoco. The Aztecs became aware of the movement of troops and launched their warriors against the retreating force. With the help of an improvised bridge Cortes and his army made it out of the city, but the casualties were staggering. According to Díaz, when Cortés returned to Tenochtitlan, the total number of troops was around 1300 soldiers, 97 horsemen, 80 crossbowmen and 80 arquebusiers. They had a several pieces of artillery and 2000 Tlaxcalan allies. During the flight from Tenochtitlan (the famous *Noche Triste*) and in the five subsequent days Cortes lost 860 men, over 60% of his force along with 1200 Tlaxcalans.<sup>52</sup> All the men were wounded with different degrees of severity; most of the treasure was lost, and, most importantly, he was left with only a few cross-bows, no artillery and only twenty-three horses.<sup>53</sup>

Escaping from the Aztec capital was not the end of the Spaniards’ ordeal. They had to travel a long distance through a densely inhabited hostile territory before reaching the Tlaxcalan kingdom. The Aztecs were relentless; warriors from Tenochtitlan and its vicinity joined in the pursuit of the Spaniards, capturing stragglers, harassing the rearguard of the army, and attempting to block his way.<sup>54</sup> At a place called Otumba the most decisive battle of the campaign was fought. Thousands of Aztec warriors converged upon this plain and launched a massive attack against the decimated, tired, hungry and thirsty Spanish army. Díaz del Castillo

<sup>51</sup> Cortés, 161.

<sup>52</sup> Díaz, CXXVIII.

<sup>53</sup> Ibid.

<sup>54</sup> Francisco López de Gómara, *La Conquista de Mexico*, ed. J. de Rojas (Madrid: Destin, 2001), 250–251.

provides the most detailed description of this confrontation.<sup>55</sup> While the numbers of Aztecs vary and are clearly exaggerated by all the accounts, it is clear that the Spaniards were vastly outnumbered. Cortés decided to mass his infantry in a closed formation. The Spaniards would withstand the relentless attacks of the Aztecs by keeping their ranks closed. The cavalry (twenty-three horses) would be divided into squadrons of five that would charge with lances against the packed mass of Aztec warriors. The horses would penetrate deep into the agglomerated Mexica warriors and then withdraw back to the protection of the infantry. This tactic would be repeated many times, killing countless opponents, taking away the pressure from the huddled Hispano-Tlaxcalan infantry, and breaking the momentum of the Aztec attack. At a crucial moment in the battle Cortés and four of his horsemen plowed through the enemy lines to reach the commander of the Aztecs. The commander was killed, and the main standard of the enemy was captured. At this point the command of the Aztec army collapsed, and the morale of the warriors crumbled. The Mexica fled with the Spaniards in pursuit.

The battle of Otumba is the crucial point in the conquest of Mexico not only because it enabled Cortés and his men to live another day, but also because it showed the peoples of central Mexico that the Spaniards could defeat the Aztecs decisively in an open engagement against overwhelming numerical odds. The Spaniards showed that they could mount an effective retreat and stand their ground against massive forces in the most precarious conditions that an army can face. It is in this battle that we can see a clear contrast between the two armies and the two military cultures confronting each other. While the killing of the Aztec commander was the climatic point of the battle, the engagement was won by the superior Spanish tactics (close ranks and tight formation) and the unbreakable battlefield discipline of the Spanish soldiers. The Aztec army fell apart when it witnessed its leader fall, but that happened only after the long and relentless charges against the Spanish infantry were repelled with massive losses on the Aztec side. The morale and the offensive integrity of the Mexica forces had been weakened before their standard was captured by one of Cortés's horsemen.

After a brief period of recovery among his Tlaxcalan allies (who were now deeply bonded by their defeat at Tenochtitlan and the victory at Otumba), Cortés began to consolidate his alliances and started to plan the

<sup>55</sup> Díaz, CXXVIII.

assault upon Tenochtitlan. Over the course of several months Cortés conducted a campaign that he describes as “pacification,” and which reminds us of some of the Castilian actions in the Canary Islands.<sup>56</sup> He and his captains conducted punitive raids on hostile areas surrounding the Tlaxcalan kingdom. They attacked towns and villages in what seems to have been a calculated campaign of terror against the allies of the Aztecs. In only a few weeks Cortés was able to break all military resistance and obtain the submission, vassalage, and assistance of the defeated lords. Cortés was also able to present himself as a magnanimous liberator who would bring Aztec rule to an end. The number of allies continued to increase, and in the meantime the Spaniards built brigantines that would be used on the final assault of Tenochtitlan. One year after facing total defeat, Cortés’s army marched upon the Aztec capital with an army of 540 foot soldiers (80 of them armed with either crossbows or arquebuses), forty horsemen and tens of thousands of Tlaxcalans and other local allies.<sup>57</sup> The horsemen were divided into four squadrons of ten, and the infantrymen were divided into nine units of 60 men.<sup>58</sup> Over the course of two months, the army and people of Tenochtitlan (already reduced and weakened significantly by a smallpox epidemic) resisted the relentless Spanish siege. However, the city fell on August 13, 1521.<sup>59</sup>

The Aztec casualties were in the hundreds of thousands. The Spanish losses were negligible. The Aztec Empire had collapsed and become part of the Castilian Crown. Native resistance and rebellions continued, but within the next twenty years most of Mexico and Central America had been thoroughly incorporated into the Castilian colonial system. As we have seen, firearms had a minimum impact upon the success of Cortés. Crossbows were far more efficient, but their numbers were never significant. Artillery had an important role in the final assault on Tenochtitlan, but its effect on the overall campaign was limited. Some of the tactics that Cortés used during the campaign were evocative of some of the infantry tactics used in Europe; other tactics were unorthodox, but they were not revolutionary. Cortés exemplified the spirit of the Renaissance; his military skills were evenly matched by his political talents; his *virtù* was matched by his *fortuna*, to put in the language of Machiavellian ideals. However,

<sup>56</sup> Cortés, 178.

<sup>57</sup> López de Gómara, 266–267.

<sup>58</sup> Ibid.

<sup>59</sup> Thomas, 524.

his army and his combat tactics had little in common with what was taking place on the battlefields of Italy under the command of men like Gonzalo Fernández de Córdoba or Pedro Navarro.

The conquest of Peru was the second pillar of the process that established Spanish hegemony in the Americas and provided a significant part of the wealth that fueled the Hapsburg military enterprises in Europe for the next century. The campaign was conducted, as in Mexico, by a small number of men against forces that were vastly superior in terms of numbers. The Spaniards in Peru faced an enemy that was far more stable and better organized than the Aztec empire. The Inca Empire was a centralized state with an efficient (if somewhat primitive) bureaucracy, a well-developed infrastructure, a fast system of communication, and a large, well trained, and experienced army. Francisco Pizarro and his army of 180 men and thirty-six horses<sup>60</sup> (later joined by small reinforcements)<sup>61</sup> had to confront terrain that was equally difficult to that encountered by Cortés but far more vast. The fall of the Inca Empire was not as precipitous as that of the Aztecs, but it was equally dramatic, and equally traditional in tactics.

When we examine the accounts of the engagements during the conquest of Peru a pattern similar to the one witnessed in Mexico emerges. The key to the conquest was a *coup de main*. After advancing through the Inca Empire without any opposition, Pizarro captured the Inca emperor Atahualpa in the city of Cajamarca. The Incas were involved in the last stages of a civil war between Atahualpa and his brother Huascar over royal succession.<sup>62</sup> Huascar had been defeated on the battlefield and captured by his brother's forces. But at the moment of victory, Atahualpa had become a captive himself. The emperor, while in captivity, managed to send the order for his brother's execution. The capture of Atahualpa and the death of Huascar deprived the Incas of effective leadership at a crucial moment. After Atahualpa was executed by the Spaniards, the members of the Inca royal family conspired with Pizarro to eliminate the competition.<sup>63</sup> While

<sup>60</sup> Pedro de Cieza de León, *The Discovery and Conquest of Peru*, trans. A. P. Cook & N. Cook (Durham: Duke University Press, 1998), 148.

<sup>61</sup> Pizarro was joined by a few Spaniards and thirteen horses from Nicaragua, and later by thirty men and twelve additional horses from Panama. Diego de Almagro, Pizarro's partner in the enterprise of conquest arrived later with 153 Spaniards and fifty horses) *Ibid.*, 153, 157.

<sup>62</sup> *Ibid.*, 156.

<sup>63</sup> While Atahualpa was collecting the gold the Spaniards had demanded for his ransom, one of his generals, Qizquiz, entered the capital city of Cuzco and killed thirty brothers of Huascar. *Ibid.*, 224.

Cortés had taken advantage of local resentment against Aztec rule, in Peru Pizarro faced a country where the people were firmly in support of their leaders, but the leadership of the empire was too fragmented to present an effective resistance. Of course, the strategic success of the conquistadors had to be supported by tactical success on the battlefield.

As in Mexico, the key to victory in the battlefield was the cavalry. During the march towards the city of Quito by the men of Sebastián de Benalcázar, an army of natives was stopped by the efficient action of the cavalry. The horsemen were arranged into squadrons that plowed into the masses of attacking Indians. At the end of the battle, hundreds of Incas had been killed by a handful of Spaniards.<sup>64</sup> The victors, however, lamented the loss of two horses since “these horses are the strength of the war and of those who waged it against these Indians.”<sup>65</sup> The horses terrified the natives, and that, coupled with the lack of defensive weapons and gear, would often force them to flee the battlefield.<sup>66</sup> Pizarro and his men had many more horses than Cortés,<sup>67</sup> and they utilized them to a devastating effect in every single engagement against the natives. There were four significant engagements on the road between Cajamarca (the city where Atahualpa was captured) and Cuzco (the Inca capital), and in all four encounters the horses played the dominant role.<sup>68</sup>

The conquest of the Inca Empire was not completed until 1572 when Vilcabamba, the last refuge of native resistance, fell, and Tupac Amaru, the last Inca, was executed in the city of Cuzco. During the forty years that had elapsed since the arrival of Pizarro, the conquest of Peru had taken place through an extremely convoluted set of events. The Spaniards arrived during the last stages of a civil war between two claimants to the throne; after the initial defeat of the Incas, a general revolt under a new claimant to the empire ensued; while the Europeans were fighting the native uprising, they were also fighting amongst each other (the faction of Pizarro against the faction of Almagro, his former partner in the conquest). And to complicate matters even further, after 1542 viceroys sent from Spain had to

<sup>64</sup> Ibid., 275.

<sup>65</sup> Ibid.

<sup>66</sup> Ibid., 280.

<sup>67</sup> In 1534 Pedro de Alvarado arrived in Peru with an expedition composed of 500 men and 327 horses. Although Alvarado was dissuaded to stay, many of his men and the horses stayed in Peru to be used by Pizarro. Ibid., 294.

<sup>68</sup> John Hemming, *The Conquest of the Incas* (Boston/New York: Mariner Books, 1970), 109.

fight the insubordinate conquistadors who were still quarreling with each other. Therefore, at different points during the conquest, Incas were fighting Incas, Spaniards were fighting Incas, and Spaniards were fighting Spaniards. The nature of the enemy, the availability of resources, and the terrain all influenced the tactics used by the combatants. And so when Spaniards confronted each other, their battles resembled the engagements that were taking place in Europe (although on a much smaller scale). At the battle of Salinas the forces loyal to Francisco Pizarro confronted the army of Diego de Almagro, who had taken control of the former imperial capital of Cuzco. The field commander of Almagro's troops, Rodrigo Orgoñez, was given a very sound plan of battle by Diego de Alvarado and Vasco de Guevara. The infantry, with the *arquebusiers* and cross-bowmen in front, would be in the center of the formation supported by the few pieces of light artillery they possessed. The cavalry would be placed on the flanks covering the full width of the field to prevent encirclement. After salvos of fire from the artillery, arquebuses, and crossbows, mounted lancers would charge the unprotected *arquebusiers* in the center of Pizarro's forces. This tactic would take advantage of the numerical superiority and speed of Almagro's cavalry, thus annulling the threat of Pizarro's concentrated firepower.<sup>69</sup> This battle plan was not followed; instead, Orgoñez moved his army from an open field to a narrow area where the terrain was not adequate for the use of horses. Pizarro's *arquebusiers* effectively reduced Orgoñez's center while his cavalry was unable to advance in the broken terrain. Many men in Almagro's camp abandoned the battlefield; those who stayed behind were soundly defeated. Orgoñez was captured and executed after the battle; Almagro suffered a similar fate after the capture of Cuzco.

This battle is significant because it is probably the only instance during the conquest of the Americas when we see an attempt to use the tactics associated with contemporary warfare in Europe, tactics associated with the Military Revolution. Of course, these tactics were never used by Almagro's army because of Orgoñez's inexplicable decision to engage the enemy in unfavorable terrain. In the end, as Paul Stewart points out, the battle was won by the discipline of Pizarro's army and the concentrated

<sup>69</sup> Pedro de Cieza de León, *Guerras Civiles del Perú*, in *Colección de Documentos Inéditos para la Historia de España*, ed. J. Rayón & F. de Zabalburu (Madrid: Imprenta de Miguel Ginesta, 1877), LXIII, 21–22.

and effective use of firepower.<sup>70</sup> This in itself was also unusually modern,<sup>71</sup> since arquebuses (aside from the initial psychological factor) had a very limited effect in all the other engagements of the Spanish conquest of the continent.

While Cortés and Pizarro were indisputably figures of the Renaissance and Machiavellian heroes (or villains depending on one's perspective), their military enterprises do not fit within the framework of the Military Revolution, as conceptualized by Roberts and Parker, or the many other variations on the model. These two commanders (and to a lesser extent men like Pedro de Alvarado, Sebastian de Benalcázar, Gonzalo Jiménez de Quezada, and Pedro de Valdivia<sup>72</sup>) changed the direction of Spanish history and redrew the future of a whole continent. They stand among other pivotal figures whose accomplishments mark the threshold of modernity; however, their military accomplishments, while epic and novel, were not truly revolutionary or even modern. The strategies, operational methods and tactics that Cortés and Pizarro utilized in the conquest of Mexico and Peru are not reproducible; they are the product of historical circumstances tied to a very specific political, technological, geographic and chronological context. While we can learn general principles of military strategy and political leadership from Cortés, there are no specific tactical lessons emanating from his military campaign that could be applied to the European theater. Consequently, the Spanish conquest of the new world is one example that shows us that a relationship between superior technology and European supremacy was not always evident. Other cases of non-European history afford us an even better opportunity to see this, since the later colonial spheres of operation were not as backward as the Eurocentric concept of a Military Revolution depicts them.

With the invention and development of guns and rifles, the visible expression of the so-called gunpowder age of Europe was seen as tremendously important for Western supremacy in the following decades and centuries. Yet recent studies have shown that India, in particular,

<sup>70</sup>Paul Stewart, "The Battle of Salinas, Peru, and Its Historians," *Sixteenth Century Journal* 19:3 (1988), 407.

<sup>71</sup>Concentrated arquebus fire had first been used at Cerignola in 1503 by the Fernández de Córdoba.

<sup>72</sup>These are the men who conquered modern-day Guatemala, Ecuador, Colombia and Chile respectively. The campaigns in which these commanders engaged follow a very similar pattern to those carried out by Cortes and Pizarro but on a smaller scale.

was already using cannons before the Portuguese ships arrived in 1498.<sup>73</sup> Consequently, in this location, seen otherwise as the epitome of colonial rule, technological backwardness was definitely not a reason for Western rule. Nevertheless, the Scottish historian Morse Stephens (1857–1919) explained the successful rule of Alfonso de Albuquerque (1453–1515) with these arguments:

The special causes of the success of the Portuguese are to be found in the superiority of their ships, their artillery, and their soldiers. The Portuguese ships at the beginning of the sixteenth century, though much smaller than the great galleons which they afterwards built for the Indian trade, were much more efficient than the Arab vessels. They had to be both well built and well fitted to accomplish the long and perilous voyage round the Cape of Good Hope, whereas the Arab ships were only intended to sail across the Indian Ocean with the favourable monsoon and then up the quiet waters of the Red Sea or Persian Gulf. But the Portuguese did not depend on sailing vessels alone in their maritime battles; they built galleys in imitation of the native craft, and secured good sailors for them by offering increased pay.<sup>74</sup>

The excellence of the Portuguese artillery and the skill of the gunners was another main cause of their victories. The natives, indeed, understood the use of gunpowder and of cannons; as many as 300 pieces of ordnance were captured at Malacca, but the Portuguese guns were always better served than those of their opponents. It was noticed at the siege of Benastarim that one of Rasúl Khán's guns did more damage than the rest, and it was soon discovered that it was being served by a Portuguese renegade. The arquebuses or clumsy muskets of the Portuguese also did them good service, though they cannot be compared to the more efficient arms of precision that came into use in the following century. Bows and arrows were the chief weapons on both sides, and the superiority of the Portuguese cross-bowmen is constantly described in different engagements.<sup>75</sup> Albuquerque himself, however, provided a different picture, observing the fact that the Indian rulers already possessed powerful fortresses and well-produced

<sup>73</sup> Richard M. Eaton and Philip B. Wagoner, "Warfare on the Deccan Plateau, 1450-1600: A Military Revolution in Early Modern India?" *Journal of World History* 25:1 (2014), 9. For warfare in India in general see Iqtidar Slam Khan, *Gunpowder and Firearms: Warfare in Medieval India* (New Delhi: Oxford University Press, 2004).

<sup>74</sup> H. Morse Stephens, *Albuquerque*, (Oxford: Clarendon Press, 1892), 166.

<sup>75</sup> *Ibid.*

cannons and firearms. His report of the attack on Goa shows that the Portuguese were not fighting an easy battle against a backward enemy.

Alfonso Dalboquerque got into a boat, and proceeded to the station where the small vessels were at anchor, with all the rest of the fleet which followed him, and there he settles himself, and sent Duarte de Lemos, Gaspar de Paiva, and Diogo Fernandez de Béja, to man their skiffs and reconnoitre the condition of the fortress. These three got up in front of it, and examined it very closely, and reported to Alfonso Dalboquerque that it was very strong, fortified with many trenches and bulwarks, and embrasured flush with the water, with much artillery therein, and a very large ditch. So Alfonso Dalboquerque, on receipt of this intelligence which the captains reported, and on consideration of the number of the forces within the city, came to the conclusion that it was a very perilous undertaking to attack it.<sup>76</sup>

The Indian enemies were anything but weak and unprepared. At the beginning of the sixteenth century, the firearms industry of Goa was one of the best in the world; its gunsmiths were also influenced by Genoese, Venetian, Mamluk, and Ottoman knowledge about the new technology. The Portuguese viceroy Albuquerque even sent some matchlocks to Portugal, which should underline the quality of the Indian gunsmiths who were not an inch behind their Bohemian counterparts at that time.<sup>77</sup> The muskets produced on the Indian Peninsula made their way around the Portuguese trade colonies, arriving in Japan some years later.

However, the example of Goa in India not only provides a good case against the Eurocentric perspective of a Military Revolution but also helps to understand how military progress works. Following a trade dispute about the import of war horses between Vijayanagara and Bijapur, the Battle of Raichur in 1520 showed that the possession of firearms was not responsible for military victory. When Krishna Raya, the ruler of Vijayanagara, accompanied by more than 25,000 cavalry, faced the well-armed army of Bijapuri, the adoption of the modern technology was not yet complete. As a consequence, the Bijapuri artillery fired all its shots at once, while the cavalry of Vijayanagara was able to gain victory in the following assault against its enemies.<sup>78</sup> Despite this victory, the events that

<sup>76</sup>Walter de Gray Birch, ed. *The Commentaries of the Great Afonso Dalboquerque Second Viceroy of India*, Vol. 3, (London: Hakluyt Society, 1880), 13.

<sup>77</sup>Eaton, Warfare, 16.

<sup>78</sup>Ibid., 18–19.

followed also show that military supremacy can easily lead to technological backwardness.

In 1565, the two powers were getting ready for another battle at Talikota. The losers from the previous engagement showed that they had prepared better and learned from their mistakes. The rulers of Vijayanagara had missed the opportunity to strengthen their army.<sup>79</sup> With regard to such developments, India also resembled Europe. However, the Indian rulers were even more successful in combining forts and artillery technology in their ruled territories, and the defeat of Bijapur in 1520 had led to a “to a program of experimentation and adaption.”<sup>80</sup> The fact that India was finally and successfully integrated into the British Empire was not a result of military supremacy in general, but of internal rivalries among the maharajas whose disunity provided the British colonizers with a suitable divide-and-rule option.

It therefore seems highly pertinent to underline the importance of the indigenous assistance that was needed by the European powers to establish colonial control. As the Indian case has shown, it was not the superior military technologies that secured the rule of the European invaders. As seen in the case of the Aztec Empire, far more decisive were the existing conflicts that allowed the colonial powers to use rivalries and tensions between local elites for their own ends.<sup>81</sup> Furthermore, the invading Europeans—like the Spanish conquistadors or the East India Company (EIC)—could only be successful by using indigenous auxiliary troops to reach a numerical equality with the enemies they had to fight. Kaushik Roy called this a “Military Synthesis”<sup>82</sup> due to which the EIC was “able to strike a balance between the European elements of war and certain indigenous military techniques and utilize the natural, human and animal resources of India in warfare.”<sup>83</sup> Roy explains why the Indian rulers, who had not been in a disadvantageous situation when the Portuguese arrived in India, were not able to catch up with the increasing threat of the EIC. They failed at the

<sup>79</sup> Ibid., 41.

<sup>80</sup> Ibid., 50.

<sup>81</sup> Geoffrey V. Scammell, “Indigenous Assistance in the Establishment of Portuguese Power in Asia in the Sixteenth Century,” in *Warfare and Empires: Contact and Conflict between European and Non-European Military and Maritime Forces and Cultures*, ed. Douglas M. Peers (Brookfield, Vt.: Ashgate Variorum, 1997), 139–140.

<sup>82</sup> Kaushik Roy, “Military Synthesis in South Asia: Armies, Warfare, and Indian Society, c. 1740–1849,” *The Journal of Military History* 69:3 (2005), 655.

<sup>83</sup> Ibid.

conceptual, institutional, economic, and political levels, since a successful combination of their traditional warfare and Western elements was not achieved by the local princes, in contrast to the EIC, which was able to adjust to the needs of the specific environment. Roy explains the failures in detail:

The princes could not make up their minds whether to conduct the Western method of warfare (pitched battles) or traditional war (skirmishes, hit and run raids). The Indian potentates also failed to construct the administrative fabric that was necessary to sustain their Westernized contingents. The Westernization programme also proved to be very costly for their exchequers. Finally, political challenges from within by the nobility forced the Indian rulers to go slow with their military reforms. To cap it all, India's traditional military culture also slowed down the process of Europeanization of the indigenous armies.<sup>84</sup>

However, the British success in India was not attained overnight, and the EIC made extensive use of indigenous auxiliary troops to establish its rule. A Military Revolution was therefore not the reason for the supremacy of the European power on the Indian Subcontinent. As in the Spanish case, it was far more the Machiavellian ability to strike alliances of convenience and to integrate foreign auxiliary contingents when needed. In addition, local conflicts among the Indian rulers were used to weaken the enemy politically and divide its military potential.

Two regional powers that emerged from the decline of the Mughal Empire therefore played an important role: the Marathas and the Sikhs. While the first had waged a guerrilla war against the Mughals in the late seventeenth century, the Sikhs had rebelled against Mughal rule because of high taxation.<sup>85</sup> A century later the post-Mughal rulers had used musket-armed troops on a large scale in addition to the mainly cavalry-based tradition of warfare in India, but "being undisciplined, they were neither capable of maneuvering collectively in the fire-swept battle zones nor able to volley fire for the maximum effect."<sup>86</sup> The troops of the EIC therefore remained superior. However, in the second part of the eighteenth century the Indian armies began to Westernize, the rulers having recognized the superior success rate of the EIC and the danger it posed. Here we again see

<sup>84</sup> *Ibid.*, 656–657.

<sup>85</sup> *Ibid.*, 658.

<sup>86</sup> *Ibid.*, 661.

the stimulating element in military progress: a menace. Indian rulers tried to recruit Western advisors and instructors for their armies, but European instructors that “gravitated towards the Indian kingdoms due to the prospect of high pay” were hard to find, especially since “the British took all possible measures to thwart the inflow of European military specialists into the Indian kingdoms.”<sup>87</sup> It was consequently not Western superiority, but the possibility of limiting the influx of Western tactics into the Indian armies, that kept the EIC superior and British rule in India in existence. In Nepal, the Gurkha kingdom was much more successful in adopting the system the EIC had been using for its infantry, since British deserters had taught them. The EIC had to send a numerically superior army with heavy artillery support in 1814 to prevent the growing threat posed by the existence of this modernized infantry on the northern border.<sup>88</sup> However, other rulers like Haidar Ali in Mysore had also experimented in order to increase their military capacities.

The infantry was trained following Western standards, but the capital-intensive Westernization was not easily kept functional, since the economic capabilities were insufficient, another factor that proves the interrelation, not the causative relation, between the economy and the establishment of larger armies. Without a centralized economy already in place, the armies could not be maintained on a functional level. In the nineteenth century, Ranjit Singh was finally able to establish a Westernized army, anticipating the total defeat of his troops otherwise.<sup>89</sup> It was again the recognition of a military threat that led to intensive measures for military progress. He hired French advisors and was able to establish a contingent of 38,000 infantry and 4000 gunners.<sup>90</sup>

To keep such a large army functioning Singh had to “reorganize his fiscal administration in order to meet the rising military expenditure,”<sup>91</sup> and thus the same political and economic developments took place as had been the case in early modern Europe in the fifteenth and sixteenth centuries. Instead of calling this the Indian Military Revolution, we ought rather to accept that the recognition of a military threat leads to a process of research and development—including the hiring of (foreign) special-

<sup>87</sup> Ibid., 664.

<sup>88</sup> Ibid., 664–665.

<sup>89</sup> J. M. Lafont, “Military Activities of French Officers of Maharaja Ranjit Singh,” *Journal of Sikh Studies* 9 (1982), 32–33.

<sup>90</sup> Roy, *Synthesis*, 677.

<sup>91</sup> Ibid., 678.

ists in the military field—to overcome the gap with the enemy army. This attempt consequently leads to a mobilization of any available resource, centralization on the political and economic levels, and probably a change to existing social orders where they relied on the traditional structures of the military order.

Singh's inability to quickly meet the costs of the needed changes—in the Indian case, the European powers were ahead—made training the crucial factor in British success. The Sikh infantry could not afford to train with a large quantity of bullets since the Sikh rulers did not have the financial capabilities to provide them sufficient rounds for practice.<sup>92</sup> Consequently, Ranjit Singh was only able to achieve partial Westernization, despite the fact that he hired fifty foreign officers—including the Frenchman Claude Auguste Court—to train his army.<sup>93</sup> Social problems were also plaguing Singh, who had to fend off existing warrior nobilities who were disinclined to accept changes in their traditional fighting styles, since the very existence of their own nobility relied on this particular kind of warfare. In 1846, Prussian officer Henry Steinbach, also employed as a foreign advisor, described the condition of the irregular cavalry of his employers:

The cavalry of the Sikh army is very inferior in every respect to the infantry. While the latter are carefully picked from large bodies of candidates for service, the former are composed of men of all sorts and sizes and ages, who get appointed solely through the interest of the different sirdars (commanders). They are mean-looking, ill dressed and, as already stated, wretchedly mounted. Their horse trappings are of leather of the worst quality.<sup>94</sup>

The desire to retain their superior position made the sirdars rely on the establishment of dependencies through military appointments, instead of changes that might have secured military effectiveness against the troops of the EIC. Moreover, “various chiefs fought among themselves over the surplus, created desolation, famine, and impoverishment within the

<sup>92</sup> *Ibid.*, 678.

<sup>93</sup> Hugh Cook, *The Sikh Wars: The British Army in Punjab, 1845-49* (New Delhi: Thomson Press, 1975), 17; Khushwant Singh, *Ranjit Singh, Maharajah of Punjab, 1780-1839* (London: George Allen & Unwin, 1962), 141.

<sup>94</sup> Henry Steinbach, *The Punjab, Being a Brief Account of the Country of the Sikhs: Its Extent, History, Commerce, Productions, Government, Manufactures, Laws, Religions, etc.* (London: Smith, Elder & Co., 1845), 89.

Maratha and Sikh domains.”<sup>95</sup> To sum up the Indian case, it is important that we recognize several Indian attempts to modernize the army following Western tactics and technologies. However, their success was limited due to the lack of political, economic, and social unity. Western supremacy in India, as in America, was consequently built on the disunity that existed in the colonial sphere itself. Enlightened rulers understood the need for a military transformation as a consequence of the external threat,<sup>96</sup> but their inability to achieve the centralization that is needed to perform such a transformation is what secured the British rule in India. Roy has therefore proposed to open up “new dimensions on the military supremacy of the Europeans in Afro-Asia,” positing that “rather than the concept of Military Revolution or Military Evolution, it might be more useful to utilize the analytical tool of Military Synthesis.”<sup>97</sup> One can agree with Roy that the concept of a Military Synthesis is valuable for the Indian cases, in which the rulers tried to synthesize their local armies with the tactics of the foreign invaders. However, the process remains evolutionary, caused by a threat, although in the Indian case the preconditions made it hard to achieve the needed change at all, and disunity played into British hands. Anirudh Deshpande argues that “the applicability of concepts like the ‘military revolution’ to Indian history appear rather complex,”<sup>98</sup> but as we have seen, we can trace at least a partial Military Revolution in India as well. However, India is not the only non-European case of an existing threat leading to a process of research and development to achieve a military transformation, thereby causing political, economic, and social change.<sup>99</sup> Japan provides another example.

Japan went through a similar process of development as Europe, and it might also be called a Military Revolution.<sup>100</sup> The age of the warring states in Japan (Sengoku period, c. 1470–1603) corresponds closely to the period in Europe for which Roberts, Parker, and Rogers sought to identify the existence of the Military Revolution. In Japan gunpowder

<sup>95</sup> Roy, *Synthesis*, 683.

<sup>96</sup> *Ibid.*, 690.

<sup>97</sup> *Ibid.*

<sup>98</sup> Deshpande, *Limitations*, 901.

<sup>99</sup> McNeill, *Pursuit of Power* shows that the success of the introduction of new technologies relies on several social components as well. For an evaluation of the role of geography in war see the forthcoming book Sarah K. Danielsson and Frank Jacob, ed. *War and Geography* (Paderborn: Ferdinand Schöningh, 2016).

<sup>100</sup> Deshpande, *Limitations*, 901.

and matchlocks were introduced by the Portuguese in 1543, the first European traders to reach those shores.<sup>101</sup> The crucial factor behind their fast and successful adoption into the Japanese military system was an existing threat. The Japanese *daimyō* (feudal lords) were at war, actively searching for a key technology to achieve military advantage and overcome their enemies. The political situation, based on a strong ruler-vassal bond, stimulated the introduction of the new technology under the orders of a particular *daimyō*. Centralization had also been already successful before the introduction of the new technology, since the *daimyō* were forced by the ongoing war against other warlords to centralize the political and economic resources in their provinces to secure their dominant position against intruders and occupiers. The preconditions of technological change were consequently already in place before the new gunpowder technology reached Japan.<sup>102</sup>

While the size of forces had grown steadily up to 1570, the use of guns was adopted rather slowly. However, step by step the “Sengoku forces became increasingly infantry dominated,”<sup>103</sup> and Oda Nobunaga (1534–1582) would finally put more weight on the new technology, with spears and bows kept alongside, similar to the musket-pikemen regiments in Europe.<sup>104</sup> It was the rivalries between the feudatory rulers that marked the Sengoku era and led to a steady process of research and development, within which gunpowder technology was just one factor among many. Until the 1570s, when Oda Nobunaga started to unify the country—a process that was finally concluded by Toyotomi Hideyoshi (1537–1598) and Tokugawa Ieyasu (1543–1616)—the warring states were in conflict.<sup>105</sup> The *daimyō* were thus trying to overcome their rivals by using Western technologies—although, notably, the muskets had arrived with the Portuguese traders from India, where the gun industry of Goa produced even better quality weapons than the Western gunsmiths. Threatened by

<sup>101</sup> Stephen Morillo, “Guns and Government: A Comparative Study of Europe and Japan,” *Journal of World History* 6:1 (1995), 81–82.

<sup>102</sup> *Ibid.*, 92–95.

<sup>103</sup> *Ibid.*, 96.

<sup>104</sup> *Ibid.*, 97–99 47.

<sup>105</sup> For a survey of the unification process of Japan see: Frank Jacob, “Tokugawa Ieyasu: Reichseiniger, Shōgun oder Japans Diktator?”. In *Diktaturen ohne Gewalt? – Wie Diktatoren ihre Macht behaupten/Dictatorships without Violence? – How Dictators Assert their Power*, ed. Frank Jacob, *Globalhistorische Komparativstudien 2, Comparative Studies from a Global Perspective 2* (Würzburg: Königshausen & Neumann, 2013).

their neighbors, more and more rulers adopted and copied the new technology: by the end of the sixteenth century Japan produced more rifles than all the countries in Europe together. With his glorious victory at the Battle of Sekigahara (1600), Tokugawa Ieyasu was able to end the internal conflict; however, he knew that this victory was insecure, and that the further use of firearms could destroy his monopoly over power and violence. Thus, when he was proclaimed as the highest military leader of the country (*shōgun*) in 1603, he began to consolidate the new power for himself and his heirs.

He initiated a real Military Revolution when he announced that firearms should be abolished because of the lack of honor in the use of guns in combat. He also prohibited foreign trade in general; thus, the country became almost totally secluded from the outside world.<sup>106</sup> Numerous samurai had indeed died a dishonorable death as a consequence of the use of muskets, but Ieyasu was mainly interested in securing power. Honor was a suitable excuse. The abolition of gunpowder in Japan secured the Tokugawa rule for many years, until 1853 when American Commodore Matthew C. Perry (1794–1858) arrived in the Bay of Edo and forced the *shōgun* to open his country for trade. It seems ironic that Perry used guns to achieve this aim, while the Japanese, who had shunned gun-related technology in the early seventeenth century, were forced to surrender in the face of a further development of the same technology two-and-a-half centuries later. The case of Japan highlights once again that the relationship between military progress and the existing political and economic structure is interrelated, but not causative. While a new technology can lead to political centralization, an already existing centralization can stimulate a much faster adoption of new technologies. Both elements are interrelated, but more in an evolutionary way, a process that is driven by the recognition of the specific need to introduce and further develop a new technology for military purposes. From Japan, however, the technology would be transferred to another Asian country where it would indeed cause social change: Korea.

A process of development that is more parallel to the European case can consequently be seen in Korea, which received its initial firearms from Japan. When Toyotomi Hideyoshi tried to conquer Korea and China in the 1590s, he used musketeers as an important part of his already numerically

<sup>106</sup> Dejima was the only and artificially created spot, where a limited trade with the Dutch was allowed during the Tokugawa period.

superior army. The Korean armies, in contrast, still followed traditional tactics, including the advice of the second century BC Chinese General Han Hsin, who had recommended searching for suitable battlefields should one's own forces be at a numerical disadvantage:

It is just that you have failed to notice it! Does it not say in *The Art of War*: “Drive them into a fatal position and they will come out alive; place them in a hopeless spot and they will survive? Moreover, I did not have at my disposal troops that I had trained and led from past times, but was forced, as the saying goes, to round up men from the market place and use them to fight with. Under such circumstances, if I had not placed them in a desperate situation where each man was obliged to fight for his own life, but had allowed them to remain in a safe place, they would have all run away. Then what good would they have been to me?”<sup>107</sup>

These tactics were not successful against the well-trained and better-equipped Japanese forces, whose musketeers killed the Korean cavalry before it could even reach the enemy. The Japanese advance seemed unstoppable. The cruel conquest of the Korean Peninsula went on, with the forces of Toyotomi killing those who were not able to escape before the troops arrived. When Japanese soldiers entered Pusan, they

found people running all over the place and trying to hide in the gaps between the houses, [...] Those who could not conceal themselves went off towards the East Gate, where they clasped their hands together, and there came to our ears the Chinese expression, ‘Manō! Manō!’ which was probably them asking for mercy. Taking no notice of what they heard our troops rushed forward and cut them down, slaughtering them as a blood sacrifice to the god of war...<sup>108</sup>

The Korean army recognized that the Japanese army was superior, and saw the effect the new gunpowder technology had on the battlefield. To imitate the Japanese tactics, Korean officers tried acquire knowledge about the new technology. Again, a threat of losing the war made change possible. The Korean soldiers consequently were not only eager to get possession of muskets, but also of Japanese prisoners, who were

<sup>107</sup> Burton Watson, trans., *Records of the Grand Historian of China. Translated from the Shih chi of Ssu-ma chien* (New York: Columbia University Press, 1961), vol. 1, 217.

<sup>108</sup> Yoshino Jingozaemon oboegaki, in *Zoku gunsho ruiju*, XX-2 (Tokyo: Zoku gunsho ruiju kansaikai, 1923).

interrogated about the details of the deadly weapons.<sup>109</sup> The Korean military staff furthermore turned to the military manuals of the Chinese Qi Jiguang (1528–1588), the troops of the Chinese Ming Empire having been able to stop the Japanese assault by relying on them. Thus the Korean army combined Japanese technology and Chinese tactics to develop its own strength.<sup>110</sup>

King Seonjo (1552–1608) was especially interested in firearms and enthusiastically promoted these new distance-oriented weapons, even if that meant breaking with the old social order in which archers had a particular social standing linked to their role in the army. Musketeers were socially promoted and regiments were established to further integrate the new technology into the army of the Korean kingdom. And Seonjo went further: not only willing to adopt a foreign technology, he was also interested in developing its use.

Finally, musketeers, archers, and swordsmen were combined to build an effective and integrated combat unit for the Korean army.<sup>111</sup> What was created was similar to the musketeer-pikemen units of Europe, yet more complex, since different far-distance weapons (archers and musketeers) were combined with the use of short-distance weapons (swordsmen). The latter could protect one class of long-distance weapon (musketeers) from nearby attack while they were reloading, while the second long-distance weapon (archers) continued to attack the far-off target. For the drill training of these units the king had also hired foreign personnel, mainly Dutch. To keep these units as effective as possible, the Korean leaders therefore developed drill training programs, which resembled advances that were used at the same time in Sweden or the Netherlands.<sup>112</sup> Like their counterparts in Europe, the Korean soldiers went through a musket revolution that also changed the social environment of the country. The archers tended to be a higher social class before the focus switched to the musketeers, who were eagerly promoted by the royal leader. Alongside drill training, the Korean government also used foreign specialists—Chinese, Dutch, and Japanese—to improve and refine the new tactics in specially established military schools, whose alumni were able to successfully counter

<sup>109</sup> Andrade, *Korean Military Revolution*, 61.

<sup>110</sup> *Ibid.*, 62–65.

<sup>111</sup> *Ibid.*, 66.

<sup>112</sup> *Ibid.*, 53.

Russian territorial ambitions in later years.<sup>113</sup> Korea therefore provides a similar example to the Military Revolution in Europe; the fact that we have now reviewed three Asian Military Revolutions in the same time period suggests once again that we should think carefully about the use of the concept. That such developments were neither distinctively European nor Asian can be further underlined by a look at events in other parts of the world.

In 1743, Nader Shah (1688–1747) assembled a Persian army that consisted of 375,000 men to conquer Iraq, which was ruled by the Ottoman Empire. His soldiers were equipped with modern muskets, and his artillery contingent comprised more than 300 cannons built for the campaign. Michael Axworthy underlines the importance that this army

was disciplined, well-motivated, well-supplied, regularly paid and fed, and included veterans of Nader's successful campaigns in India and Central Asia. It had beaten the Ottomans before and would do so again. It is no exaggeration to say that at this date, it was not only the most powerful single force in Asia but possibly in the world. Its creation and maintenance had begun processes that could, in time, have brought about great and lasting changes in Persia.<sup>114</sup>

The Safavid Empire had already been able to adopt gunpowder technology, passing on to Nader Shah the benefits of a long process of research and development, adaptation and training, which he now incorporated into his immense army. However, the Persian development resembles a half-finished Military Revolution in the European sense, since fortresses were not strengthened in the region. The latter fact was a consequence of the natural borders of the region, which provided a feeling of security and the idea that such fortifications were senseless.<sup>115</sup>

Having gained experience on the campaigns he waged to consolidate his rule, Nader recognized the need for a strong infantry and therefore put efforts into drilling his soldiers.<sup>116</sup> Superiority in firepower had led to successes against the Afghans, and the Persian cavalry was now proving itself against the Ottoman troops.<sup>117</sup> Nader Shah's death prevented fur-

<sup>113</sup> *Ibid.*, 78–79 and 82–83.

<sup>114</sup> Michael Axworthy, "The Army of Nader Shah," *Iranian Studies* 40:5 (2007), 635.

<sup>115</sup> *Ibid.*, 637.

<sup>116</sup> *Ibid.*, 638.

<sup>117</sup> *Ibid.*, 642.

ther development of the Persian military system, which otherwise could have led to similar changes as in early modern Europe—since an army as large the one Nader was leading against Iraq would have needed political and economic reform if it were to be for a longer time period. His death caused turmoil in the decades that followed, preventing the consolidation of the military reforms only just initiated.

The Ottoman Empire, against which Nader was planning his war, provides another non-European instance of a Military Revolution. Jeremy Black had already pointed out that

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.<sup>118</sup>

Our focus so far—Central America, India, Japan, Korea, Iran—has already proved this and moreover has highlighted the weaknesses of the concept of a Military Revolution itself; but to be as global as possible we would like to add a short discussion of the Ottoman Empire. As historians working in this field have shown, the wars between the Ottomans and early modern Hungary saw tremendous military changes that resemble the developments of early modern Western Europe.<sup>119</sup> Research over the last twenty years, especially the works of Gábor Ágoston, has proven that the Ottoman Empire was anything but inferior to the other European powers in that period.<sup>120</sup> The Ottomans had developed an effective system of

<sup>118</sup> Jeremy Black, “A Wider Perspective: War outside the West,” in *Early Modern Military History, 1450-1815*, ed. Geoff Mortimer (New York: Palgrave, 2004), 212.

<sup>119</sup> Jozsef Kelenik, “The Military Revolution in Hungary,” in *Ottomans, Hungarians and Habsburgs in Central Europe: The Military Confines in the Era of Ottoman Conquest*, ed. Géza Dávid and Pál Fodor (Leiden: Brill, 2000), 118–159.

<sup>120</sup> Gábor Ágoston, *Guns for the Sultan: Military Power and the Weapons Industry in the Ottoman Empire* (Cambridge, Cambridge University Press, 2005); Gábor Ágoston, “Habsburgs and Ottomans: Defense, Military Change and Shifts in Power,” *The Turkish Studies Association Bulletin* 22:1 (1998), 126–141; Gábor Ágoston, “Merces Prohibitae: The Anglo-Ottoman Trade in War Material and the Dependence Theory,” *Oriente Moderno* 20:1 (2001), 177–192; Gábor Ágoston, “Ottoman Artillery and European Military Technology in the Fifteenth and Seventeenth Centuries,” *Acta Orientalia Academiae Scientiarum Hungaricae* 47:1–2 (1994), 15–48; Gábor Ágoston, “Ottoman Warfare in

logistics and resource management. The infantry troops of the Ottoman Empire used muskets, used volley fire, and therefore went through the same stages of research and development in technology and tactics as other European armies at the same time.<sup>121</sup> Ottoman sources show that the use of volley fire by Janissaries is already evident in 1605.<sup>122</sup> With the chronicle of Abdülkadir Efendi we also have access to an Ottoman manual that gives us a vivid impression of how the troops of that time were trained.<sup>123</sup> We have to accept that the soldiers of the Ottoman Empire were not inferior, and that volley fire was a global invention: Oda Nobunaga had used it in Japan, the Ottomans on the Balkans, and Western European states in Parker's own Military Revolution. We must argue, therefore, that there were several Military Revolutions or, as we would prefer, abolish the idea of a Military Revolution altogether, replacing it with the concept of an evolutionary process of research and development that peaked whenever a threat was recognized by those in charge of the military resources and planning. Without a threat there was no need to modernize, Westernize, expand, or better equip the army at all.

The focus on Western Europe also excludes Russia, which in pre-Petrine times also went through tremendous military developments.<sup>124</sup> Ivan III (1440–1505) centralized Russia politically and militarily.

In the fifteenth, sixteenth, and seventeenth centuries, roughly at the same time as Roberts's Military Revolution in the West, Russia underwent similar—though not identical—changes to those occurring in Western Europe: adopting gunpowder weapons; adapting its military organization as it shifted its focus away from the horsemen of the steppe to the more Western infantry-based armies of Poland-Lithuania, the Livonian Germans, and Sweden; and rebuilding its fortresses both to utilize and withstand artillery. Several variables dictated that the Military Revolution in Russia would differ

Europe, 1453-1826," in *European Warfare, 1453-1815*, ed. Jeremy Black (New York, St. Martin's Press, 1999), 118–144. See also: Caroline Finkel, *The Administration of Warfare: The Ottoman Military Campaigns in Hungary, 1593-1606* (Vienna: Verband der wissenschaftlichen Gesellschaften Österreichs, 1988) and Rhoads Murphey, *Ottoman Warfare, 1500-1700* (New Brunswick, NJ, Rutgers University Press, 1999).

<sup>121</sup> Günhan Börekçi, "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," *Acta Orientalia Academiae Scientiarum Hungaricae* 59:4 (2006), 410.

<sup>122</sup> *Ibid.*, 411.

<sup>123</sup> *Ibid.*, 412–417.

<sup>124</sup> Paul, Russia, 11.

significantly from and come later than the Military Revolution in the West. Until the seventeenth century Russia's enemies had cavalry-based armies and could only be fought by cavalry, not by infantrymen armed with gunpowder weapons.<sup>125</sup>

This view on Russia also favors our argument for an evolutionary process with peaks. In the Russian case the evolution would have been slower than in Western Europe, something that could be related to the need of a serious threat as well steady competition in order to stimulate development. It is the “early modern arms race” that stimulated progress, and Russia between 1470 and 1709 provides us with an example of “a steady, incremental learning and experiential process across some ten to twelve generations.”<sup>126</sup>

To finally answer our first question, then, we can state that the developments that have been called a Military Revolution were definitely not only a European phenomenon. Historians working on Asian history have shown the diversity with regard to military developments that resemble European developments in several of these countries. Cases like Iran, the Ottoman Empire, and Russia further stimulate the debate about the worth of the concept of a Military Revolution at all. Eurocentric theories are no longer able to explain specific military-based processes of advance that happened all around the world.<sup>127</sup> In addition, a closer look at cases from Central America and India makes clear that the rise of the West was not based on superior military technologies, but rather on the existence of internal quarrels that prevented the evolutionary adoption of new military technologies, with all its political, economic, and social consequences. The following chapter will prove in addition that what has been introduced as the Military Revolution was not a unique process in early modern Europe but something that happened repeatedly in different chronological settings, ranging from antiquity to modern times. Consequently, at best we must talk of countless military revolutions, and this can only work against the use of this outdated concept.

<sup>125</sup> Ibid., 44–45.

<sup>126</sup> Brown, Poltava, 123.

<sup>127</sup> Gábor Ágoston, “Firearms and Military Adaption: The Ottomans and the European Military Revolution, 1450-1800”, in *Journal of World History* 25:1 (2014), 99–100.

## Numerous Military Revolutions?

**Abstract** Over the course of history several instances of “revolutionary” military changes can be observed. Examples of this are the tactics of the Macedonian armies, the development of the *trace italienne*, the rise of pike and arquebus formations, and the technological developments of WWI. Under close examination, these apparent revolutionary transformations reveal themselves to be the product of evolutionary processes whose development accelerates or slows down in response to military needs. The numerous instances of this type of historical occurrence nullify the concept of a Military Revolution as a viable explanation to the developments of the Early Modern period.

**Keywords** Alexander the Great • Trace italienne • World War I

The basis for the theory of a Military Revolution is the “mass adoption of firearms as a tool of warfare.”<sup>1</sup> In reply, we must ask: Could the adoption of a single technology ever be sufficient to explain something that can be characterized as a revolution? When we recall that an event of revolutionary proportions has to have consequences from a political, social, economic, and technological perspective, it is definitely not enough to focus just on firearms; only when we combine this development with an

<sup>1</sup>Ibid., 85.

increase in the numbers of infantry, the adoption of a higher level of state control, and other aspects, can we justify the use of the term. However, if that is what we call a Military Revolution, we seem obliged to consider the term in the plural. Since the history of war cannot be simply the history of events<sup>2</sup> but also has to take different factors into consideration, the term ‘revolution’ seems otiose: Many periods of development in the long history of warring humanity would thus deserve the appellation ‘Military Revolution.’ We will argue in the next chapter that there are numerous events in all time periods that would thus receive the label; this is further evidence that the concept is unsuited to illuminating the broad sweep of military progress from a global as well as chronological perspective.

According to Carl von Clausewitz (1780–1831), warfare aims always to wear down the enemy<sup>3</sup> and to win a battle or a whole war; this fact is immutable. To achieve this aim, generations of armies have tried to acquire the best available technology and the highest level of economic and political support, as well as claim social prestige for their actions.<sup>4</sup> The peaks of such developments are engendered by a powerful threat, due to which the inferior power is forced to instigate a process of research and development. If we would use the term Military Revolution to describe such a scenario, we can find countless examples in every age.

When the Athenians started to recruit *thetes* for the triremes during the Persian Wars (499 BC–449 BC), they not only increased their manpower, which was needed to keep the ships sailing, but they also initiated a political and social change leading to an increasingly democratic system in Athens itself. And this is just one example from antiquity. When Alexander the Great (356 BC–323 BC) conquered the Persian Empire, he relied heavily on his cavalry, a part of his army that had already been developed under Philip II (382 BC–336 BC), who had started to focus his military tactics on this cadre. The newly established *hetairoi* became the heart of the army and a tactical asset in Alexander’s hand, and he used them to destroy the Persian military order through a so-called hammer and anvil tactic.<sup>5</sup> Philip had not only created a fast, mobile and highly destructive

<sup>2</sup>Volker Schmidtchen, *Kriegswesen im späten Mittelalter* (Weinheim, VCH Verlagsgesellschaft, 1990), 8.

<sup>3</sup>Carl von Clausewitz, *Vom Kriege* (Neuenkirchen, RaBaKa Publishing, 2010), 179.

<sup>4</sup>Herfried Münkler, *Über den Krieg. Stationen der Kriegsgeschichte im Spiegel ihrer theoretischen Reflexion* (Weilerswist, Velbrück Wissenschaft, 2002), 200.

<sup>5</sup>Hans Delbrück, *Geschichte der Kriegskunst im Rahmen der politischen Geschichte*, 7 vols. (Berlin: Stilke, 1900–1936); Max Jähns, *Handbuch einer Geschichte des Kriegswesens. Von der*

group of soldiers, but a military elite as well. When this was supplemented by political expansion to the parts of Greece where the best horses were bred, Philip revolutionized the warfare of antiquity. Philip also established a powerful infantry equipped with the long lance (*sarissa*), a change that also strengthened the social standing of the ordinary foot soldier. Step by step, the king of Macedonia increased his army and started to conquer the surrounding regions. Finally, the hoplites of Southern Greece were no longer the standard against which others were judged, a fact that was underlined in the Battle of Chaeronea (338BC) when Alexander's cavalry slaughtered the Sacred Band of Thebes.<sup>6</sup>

However, the changes that were introduced by Philip II did not only impact the military success of Alexander. They created the need for his campaign in general. Philip's reforms had created an army of a size that needed steady financial resourcing, which the Macedonian kingdom was not able to provide. Philip had to conquer the surrounding regions to expand his reservoir of supplies. When Alexander took over rule after his father's death, the logical consequence was an attack on the Persian Empire, as the exploitation of resources of recent years demanded new spheres that could offer new economic gains. The military reforms of Philip II demanded an extension of political rule in order to secure the resources needed to finance the consequences of the reforms themselves. The "state" in this case not only had to take over, it also had to expand to secure economic resources—and, indeed, to secure political legitimization for such a large army, on which the power of Alexander was based. Antiquity, however, is not the only age that provides us with examples of military reforms that led to "revolutionary" changes.

Clifford Rogers, who focused his research on the Hundred Years' War (1337–1453), identified several military revolutions in this particular time period: the "Infantry Revolution," the "Artillery Revolution," and a "revolution in fortification."<sup>7</sup> Rogers had already mooted the idea of a "punctuated equilibrium evolution"<sup>8</sup> but was not yet willing to abolish

*Uhrzeit bis zur Renaissance*, 2 vols. (Leipzig: Verlag von Fr. Wilh. Grunow, 1878–1880); Charles Oman, *A History of the Art of War. The Middle Ages from the Fourth to the Fourteenth Century* (London: Methuen & Co., 1898).

<sup>6</sup> For a detailed analysis of the importance of horses for Alexander's strategies see the forthcoming article: Frank Jacob, "Der Aufstieg Makedoniens: Eine Erfolgsgeschichte antiker Kavallerie," in *Pferde in der Geschichte*, ed. Frank Jacob (Darmstadt, Büchner, 2016).

<sup>7</sup> Rogers, *Military Revolutions*, 244.

<sup>8</sup> *Ibid.*

the idea of a Military Revolution per se. He posited several consecutive military revolutions in Europe between 1300 and 1800, “each of which dramatically altered the nature of warfare over a short span of time.”<sup>9</sup> He argued against the evolutionary concept by pointing out that “Evolution normally implies advancement through a near-infinite number of infinitesimal changes, and that, clearly, is not the conceptualization we want.”<sup>10</sup> From our perspective, of course, it is exactly the concept we want. Parker’s concept of the Military Revolution mainly focused on the above-mentioned impact of the *trace italienne*, but the developments in connection with this new kind of fortress are also more interrelated than causative.

According to Parker, the *trace italienne* is the architectural answer to the development of heavy and concentrated artillery fire over the course of the fifteenth century.<sup>11</sup> As mentioned above, Clifford Rogers details the transformation of artillery over the course of the Hundred Years’ War from inaccurate bombards designed to wreak random destruction inside cities and castles to accurate and powerful guns built to demolish outer walls; he thereby had already made it clear that the development was more of an evolutionary process of research and development.<sup>12</sup> By the time French King Charles VIII (1470–1498) invaded Italy in 1494, he could engage the enemy with an arsenal of forty heavy guns that forced the Italians to look at warfare in a completely different manner.<sup>13</sup> Francesco Guicciardini (1483–1540) relates in his *Storia d’Italia* how during this invasion the French used a new type of artillery called *cannoni*, cast entirely in bronze and using iron balls as ammunition.<sup>14</sup> These cannons were transported on carriages and pulled by horses (rather than oxen, as was customary in Italy). The Florentine historian contrasts the fast, accurate and devastating power of the French cannons with the lassitude and inefficacy of the bombards used by Italian armies only a decade earlier.<sup>15</sup> According to Parker, it was this display of devastating firepower during the Italian Wars that became the impetus for the construction of ever-more complex fortifications built in a new style. The foundational module

<sup>9</sup> Ibid., 276.

<sup>10</sup> Ibid., 277.

<sup>11</sup> Parker, *Rise of the West* (1996), 8.

<sup>12</sup> Clifford Rogers, “Military Revolutions of the Hundred Years War,” in *The Military Revolution Debate*, Clifford Rogers (Boulder: Westview Press, 1995), 64–73.

<sup>13</sup> Parker, *Rise of the West* (1996), 9–10.

<sup>14</sup> Francesco Guicciardini, *Storia d’Italia* (Torino: Einaudi 1971), Libro Primo, XI.

<sup>15</sup> Guicciardini is particularly impressed by the French artillery’s rate of fire. Ibid.

of this new style of fortifications was the bastion, an angular salient that offered defensive artillery the ability to cover a field of fire with no “dead zones” (areas outside the view and range of the defenders). The addition of bastions to the walls of medieval cities eventually led to the design and construction of more formidable and intricate fortifications. The angular bastion became the emblematic element in a re-conceptualization of the stronghold that included polygonal layouts, low-laying structures, thick walls, sloped profiles, earthworks, moats, scarps, counterscarps, and ravelins and crownworks (free-standing artillery platforms that covered the approaches to the main structure). The Italian style of building fortresses had the main tactical purpose of resisting the firepower of the new heavier and more accurate artillery and avoiding the “enfilade” (a flanking attack) by creating interlocking fields of fire with no dead zones.

Like all inventions, the bastion and the *trace italienne* were the product of gradual development. However, we can identify key figures and influences in the evolution of the concept. We should see the *trace italienne* within the context of Renaissance artists’ fascination with symmetry and geometric forms, as well as their desire to revive Roman architectural paradigms. The works of Brunelleschi (1377–1446) and Piero della Francesca (1415–1492) come to mind. Closer to the present topic is Leon Battista Alberti, (1404–1472) who, around 1440, wrote *De Re Aedificatoria*, a treatise on architecture in which it was suggested for the first time that fortifications should be built with angular points resembling “the teeth of a saw.”<sup>16</sup> In the 1460s, influenced by Alberti, the architect Filarete produced a design for the city of Sforzinda, a utopian urban vision whose purpose was to glorify the newly established dynasty of the Sforza in Milan. Sforzinda (which was never built) was planned as a walled city with a layout in the shape of a star with eight points (with towers at each of the external vertices and gates at the internal vertices).<sup>17</sup>

Theory and practice come together in the figure of Francesco di Giorgio Martini (1439–1502). Di Giorgio produced his *Trattato di architettura civile e militare* between 1475 and 1495.<sup>18</sup> It is in this work (which according to Elizabeth Merrill was produced as an instructional manual for the

<sup>16</sup>Parker, *Rise of the West* (1996), 8–9.

<sup>17</sup>S. Lang, “Sforzinda, Filarete and Filelfo”, *Journal of the Warburg and Courtauld Institutes* 35, (1972), 391–397.

<sup>18</sup>E. M. Merrill, “The Trattato as Textbook: Francesco di Giorgio’s Vision for the Renaissance Architect,” *Architectural Histories* 1:1 (2013), 20, doi:[10.5334/ah.at](https://doi.org/10.5334/ah.at).

dukes of Urbino) that for the first time we see the concept of the bastion explicitly delineated and discussed. Martini finished the first version of his treatise thirteen years before Charles VIII's invasion of Italy, and therefore the conceptual birth of *trace italienne* precedes the event that Parker establishes as the point of departure of his military revolution. In fact, as early as 1487, Giuliano Sangallo (1443–1516) and his brother Antonio Sangallo the Elder (1455–1534) had built a fortress with an encircling wall that incorporated angular bastions at Poggio Imperiale in Tuscany.<sup>19</sup> It seems, then, that the French invasion of the 1490s was not the cause of but rather extra motivation for a vision of military architecture that had already been incubating for at least half a century.

By the 1490s Pope Alexander VI (1431–1503) had commissioned Giuliano Sangallo to re-enforce the defense works around Castel Sant'Angelo in Rome. Sangallo (who may have met di Giorgio while living in Naples)<sup>20</sup> produced a structure with prominent pentagonal bastions. By the dawn of the sixteenth century, Giuliano and his brother had produced several bastioned fortresses that show their evolving notions of military architecture.<sup>21</sup> In the 1530s, there were approximately fifty fortresses or defensive structures across Italy that incorporated bastions and polygonal elements.<sup>22</sup> By then, the basic architectural language of the *trace italienne* had been firmly established.

This does not mean, however, that the *trace italienne* had been universally adopted and understood. In *Dell'arte della Guerra*, written in 1520, Niccolò Machiavelli (1469–1527) dedicates a section to the discussion of fortifications.<sup>23</sup> He is well aware of the importance of artillery, and his advice on how to build forts includes modern elements such as integrated defenses, deep embankments, flanking recesses, and casemates at the bottom of the moat. Nonetheless, his overall conception of military structures shows a lack of familiarity with the *trace italienne*. He speaks of two concentric enclosures separated by a ditch (with a tall external wall and a lower internal wall), towers built along the curtain walls at intervals of 400 feet, entrances protected by portcullises (vertically gliding latticed gates), and thick merlons along the walls. Surprisingly, there is no mention

<sup>19</sup> John R. Hale, *Renaissance War Studies* (London: The Hambledon Press, 1983), 17.

<sup>20</sup> *Ibid.*, 8.

<sup>21</sup> *Ibid.*, 23.

<sup>22</sup> *Ibid.*, 28.

<sup>23</sup> Niccolò Machiavelli, *Dell'arte della Guerra*, in Machiavelli, *The Chief Works and Others*, Vol. II, trans. by A. Gilbert (Durham/London: Duke University Press, 1989), 703–708.

of bastions or polygonal designs. Machiavelli insists on the superiority of French methods of design and construction, oblivious to the innovations generated by Italian architects since the 1490s.<sup>24</sup> By the year 1526, however, Machiavelli writes a letter in which he recounts an official inspection of Florence's defenses, where General Pietro Navarro (1460–1528) offered his advice on how to fortify the city.<sup>25</sup> Navarro's recommendations delineate a plan that fully embraces the concept of the *trace italienne*, with low-lying structures built on an angular layout, artillery providing crossfire, and bastions located at strategic points. Unfortunately for the Florentines, Navarro's recommendations were not implemented with sufficient alacrity. A fresco painted by Giorgio Vasari (1511–1574) in the Palazzo Vecchio depicts the 1529/1530 siege of Florence by Spanish and Imperial troops. The panoramic view of the city and the besieging army clearly shows the city "protected" by thin, crenellated walls with quadrangular towers. Along the vast perimeter of defenses one can see only three locations where modest polygonal structures were added to the medieval walls. The city inevitably fell to the besieging forces.

The Papal States had pioneered the constructions of bastions in the late fifteenth century, and as we saw in Machiavelli's report, Pope Clement VII (1478–1534) (a member of the Medici family) was interested in providing Florence with *trace italienne* defenses in 1526. However, as late as 1540 the city of Rome lacked a comprehensive system of modern defenses. The sack of the city by the imperial forces of Charles V (1500–1558) in 1527, and the menace of a Turkish raiding fleet in 1534 (along with the failure of Florence to withstand a siege), prompted the Papal authorities to commission the construction of vast defense works that would encircle the whole city.<sup>26</sup> The project was awarded to Antonio Sangallo the Younger (1484–1546) who produced an ambitious design that after contentious debate never came to fruition, mainly because of excessive costs.

But it was obvious that the former style of warfare had totally changed as a consequence of the use of artillery and early modern guns, a fact that was also described by Georgius Agricola (1494–1555):

<sup>24</sup> Ibid.

<sup>25</sup> Niccolò Machiavelli, *An Account of a Visit Made to Fortify Florence: A Letter to the Ambassador of the Republic in Rome*, in *Machiavelli, The Chief Works and Others, Vol. II*, trans. by A. Gilbert (Durham/London: Duke University Press, 1989), 727–734.

<sup>26</sup> Simon Pepper, "Planning versus Fortification: Sangallo's project for the defense of Rome," *Fort 2* (1976), 33–49.

a missile or an arrow fired by a bow or a scorpion is able to pierce a body; in contrast the iron bullet of a gun can be shot through the bodies of many people. And no marble or rock ... is solid enough that the bullet cannot break through it with its blow and force.<sup>27</sup>

The cities and their rulers had to react to this threat. By the mid-sixteenth century the wealthy republic of Siena also lacked modern fortifications. It was only under the imminent threat of a Florentine and Imperial invasion that the Sienese decided to engage in a vast process to fortify Siena and its surrounding towns to the current standards of military architecture.<sup>28</sup> The project bankrupted the republic, and by 1555 Siena had been conquered and annexed by Florence.<sup>29</sup> This shows that even after universal consensus about the value and effectiveness of the *trace italienne* had been achieved, economic considerations remained an impediment to its full implementation. In the Netherlands, where the idea of the *trace italienne* was enthusiastically embraced at an early point, the majority of its 200 walled cities had fortifications that were mostly medieval in design as late as the 1590s.<sup>30</sup> According to Mahinder Kingra, the limits to the implementation of the Italian style of defensive works was not only the exorbitant cost of construction but also the fact that both Spanish and Dutch commanders had adopted tactics and strategies to cope with the lack of modern fortifications.<sup>31</sup>

While the development of the *trace italienne* is undeniably a pivotal element in the transformation of warfare in the early modern period, its slow and uneven adoption forces us to question its role as a causal element in military change. And that is not the only reason to object to Parker's theory of a Military Revolution.

The central element in Roberts's concept of a Military Revolution is the amply documented development of infantry tactics among the armies of the Netherlands in the 1560s, later perfected by Gustavus Adolphus. Parker, on his part, claims that the infantry revolution starts as a response to the French invasion of Italy in 1494. For Roberts the revolution comes in the shape of shallow formations of *arquebusiers* that can provide rolling

<sup>27</sup> Georg Agricola, *Zwölf Bücher vom Berg- und Hüttenwesen* (Berlin, VDI-Verlag, 1928), 8.

<sup>28</sup> David Parrot, "The Utility of Fortifications in Early Modern Europe: Italian Princes and their Citadel, 1540-1640," *War in History* 7:2 (2000), 132.

<sup>29</sup> Ibid.

<sup>30</sup> Kingra, *Trace Italienne*, 438.

<sup>31</sup> Ibid., 439.

barrages of fire. Parker sees a revolutionary transformation in the massive squares that combined the pikes and arquebuses used by the armies of Spain. The term ‘revolution’ implies a radical departure from previous models, a transformation from which there is no return to older parameters and practices. However, what we see in terms of the use of infantry in the period between 1494 and 1659 is implementation, combination, coexistence, alternation, and phasing-out of old and new matrices of combat. Lutzen and Breitenfeld can be viewed as proof of the triumph of the new tactics of the Swedish armies, but the same Swedish armies were crushed at Nordlingen by a force that was using what by 1634 would be regarded as “older” tactics, according to Roberts or Parker. One must keep in mind that in war no practice is ever obsolete as long as it produces victory. Therefore we need to stop thinking of military transformation simply in terms of the abandonment of old models for new. In the case of infantry tactics, the case for revolution seems less convincing as one looks into the origins of their success in the fourteenth, fifteenth, and sixteenth centuries. The process seems to be one of improvisation, adoption, adaptation, evolution, and finally standardization of methods that prove effective.

While there is no doubt that the Italian Wars were a laboratory for new strategies, tactics, and operational models, this experimentation often involved the adaptation of older practices. The use of infantry armed with spears or pikes against cavalry charges is not an invention of the early modern period or a Renaissance reinvention of classical models. One can recall the battles of Legnano (1176), Stirling (1297), Courtrai (1302), Arques (1303), or Mons-en-Pévèle (1304), when infantry defeated (or were close to defeating) mounted enemies. It is important to note, however, that these battles did not lead to the systematic adoption of the tactics that brought success during those specific encounters.<sup>32</sup> The battles did not engender reforms in command structure, recruitment practices, military theory, operational planning, or overall strategy. This, however, is

<sup>32</sup>In the case of the battles of the Franco-Flemish War, it is evident that the Flemish infantry formations had a limited effectiveness. During the battles of Courtrai and Arques, the Flemish infantry, armed with *goedendag* and pikes, was successful in a defensive position; the French cavalry was decimated as they relentlessly tried to break the Flemish formation. However, at the battle of Mons-en-Pévèle the Flemings were defeated as they abandoned their hitherto successful defensive position and launched an attack on the French camp. Kelly DeVries, *Infantry Warfare in the Fourteenth Century: Discipline, Tactics and Technology* (Suffolk, UK: Boydell & Brewer Ltd, 1996), 9–48.

not the case with the conflicts involving the Swiss. Starting with the battle of Morgarten in 1315, the *Eidgenossen* (Confederates) of the Swiss cantons began to develop a tactical model that enabled infantry (specifically halberdiers and pikemen) to consistently defeat cavalry armies over the course of two centuries.

The genesis of one aspect of what historians would later describe as Military Revolution is linked to the geography and the peculiar socio-political conditions of the Central Alps. The creation of local and regional alliances since the collapse of the Hohenstaufen led to the formation of cantonal and city militias in what would become Switzerland. While the Swiss cantons had local landed nobility that fought on horse and embraced the ideals of chivalry, the growth of commerce and manufacturing shifted the balance of power towards the cities and their councils (representing both mercantile elites and guilds).<sup>33</sup> In their quest for autonomy, the Swiss cantons and towns organized militias that were primarily composed of infantry. From the thirteenth century on, Swiss cantons began to organize into peaceful or mutual defense alliances in order to assert their autonomy from feudal overlords. The pact among Schwyz, Uri, and Unterwalden in 1291 is considered the foundational event of what later would become the Swiss Confederacy.<sup>34</sup> The initial test of the nascent confederacy came at the Battle of Morgarten in 1315 when the army of Leopold of Austria (1290–1326) was crushed by the army of the three cantons.<sup>35</sup> Leopold's army was composed largely of cavalry, whereas the Swiss troops were infantry in their totality (armed with halberds). Morgarten was an ambush in a narrow mountain pass; the terrain gave all advantage to the Swiss, and therefore the battle did not set a tactical precedent that could be reproduced in a different landscape. However, Morgarten is the first in a long list of battles where Swiss infantry consistently defeated mounted troops, and the first in a series of battles that, in retrospect, trace the evolution of a new approach to warfare. At Laupen in 1339 the foot soldiers of Bern and their Forest Cantons allies defeated the mounted knights of Fribourg on an open field.<sup>36</sup> During this battle the Bern militia adopted a densely

<sup>33</sup> Clive Church and Randolph Head, *A Concise History of Switzerland* (Cambridge: Cambridge University Press, 2013), 18.

<sup>34</sup> *Ibid.*, 23.

<sup>35</sup> *Ibid.*, 188.

<sup>36</sup> DeVries, *Infantry Warfare*, 129.

packed wedge formation on top of a hill where they resisted the successive charges of the Burgundian knights.<sup>37</sup>

At Sempach, in 1386, the infantry of the Swiss Confederates once again defeated Duke Leopold III of Austria (1351–1386) and his knights.<sup>38</sup> Because of the nature of the terrain, on this occasion the knights had to dismount and fight on foot. This time the Swiss, formed in a wedge, charged against their Hapsburg enemies repeatedly until they broke their lines and their fled to the rear in panic. The victory of the Swiss was overwhelming, but the battle could have gone either way.<sup>39</sup> The tactical significance of the battle is that the Swiss forced the Austrians to dismount and fight according to their own terms. The Swiss also drew an important lesson from their victory. The primary weapon of the Austrian knights was the lance. As the knights dismounted and effectively became infantry, their lances assumed the function of pikes. Faced with this formidable weapon used in a defensive fashion, the Swiss suffered significant losses trying to penetrate the enemy lines and only succeeded when they shifted their attack to the flanks, backed by fresh reinforcements.<sup>40</sup> Apart from establishing the independence of the Confederacy, Sempach showed the superiority of pikes over halberds. This was confirmed at the Battle of Arbedo in 1422, when the Milanese *condottiero* Francesco Bussone da Carmagnola (c. 1382–1432), after first having his cavalry repulsed by the Swiss, ordered his knights to dismount in order to confront the Confederates with their lances functioning as pikes. The army of Milan heavily outnumbered the Swiss, and despite heroic efforts, the Confederates were defeated.<sup>41</sup> Machiavelli believes that the reason the Milanese won the battle was that the dismounted men-at-arms wore full armor whereas the Swiss did not; once the men of Milan were able to open breaches among the Swiss pikes, the Confederates were at a disadvantage (their pikes and halberds rendered useless at close quarters against the swords of the Milanese).<sup>42</sup> Machiavelli's explanation notwithstanding, after the Battle of Arbedo the Council of Luzern decreed that a larger number of pikes should be

<sup>37</sup> Ibid., 134.

<sup>38</sup> Oman, *Art of War*, 77–79.

<sup>39</sup> Ibid., 78.

<sup>40</sup> Douglas Miller and Gerry Embleton, *The Swiss at War, 1300-1500* (Oxford: Osprey, 1979), 10.

<sup>41</sup> Oman, *Art of War*, 79–80.

<sup>42</sup> Niccolò Machiavelli, *The Art of War in Machiavelli in The Chief Works and Others*, Vol. II, trans. by A. Gilbert (Duke University Press: Durham and London, 1989), 599–600.

incorporated into the army.<sup>43</sup> The armies of the Swiss would look different during the wars against the Duchy of Burgundy.

Along with halberdiers and pikemen the Swiss armies had important contingents of men armed with crossbows. By the mid-fifteenth century they were to incorporate hand-held firearms and field artillery. Grandson, Morat and Nancy—the three crucial battles that crushed the political aspirations of Charles the Bold (1433–1477), Duke of Burgundy—provide us with the image of a fully developed model of combat based on a long history of field and logistical experience. At Grandson (1476) the Swiss formed a large square (about 10,000 men) with pikemen supported by halberdiers at the edges. After a brief exchange of artillery fire, the Burgundian cavalry charged. As the two sides clashed, the crossbowmen and hand-gunners in the middle of the square opened fire.<sup>44</sup> As several frontal cavalry charges failed to break the Swiss formation, Charles decided to recede his center and turn his wings on the flank of Confederates in a tactic reminiscent of Hannibal (c. 247–183 BC) at Cannae.<sup>45</sup> The Swiss seemed to be falling into the Burgundian trap, until the main body of Confederates, which had been on the march, appeared on the battlefield organized in three massive columns. The Burgundian wings broke formation and generalized panic took over.<sup>46</sup> The Swiss victory at Grandson cannot be fully attributed to the use of pikes in a tight formation; a big factor was the lack of Burgundian discipline as they faced the presence of an unexpected force on the battlefield, and we cannot discount the failure of their scouts to gauge the full dimensions of the Swiss force prior to the battle.

A few months later, at Morat, the Swiss dealt an even more devastating defeat to Charles of Burgundy. As the Burgundian army was laying siege to the town of Morat, a large army of Swiss moved without being noticed through a forest behind the enemy camp. Charles's forces were caught in disarray, and even though they inflicted significant losses upon the Swiss, the latter overran the camp's defenses and completely surrounded and annihilated the Burgundians, who could not escape the encirclement. It is believed that Burgundy lost up to 12,000 men whereas the Confederate

<sup>43</sup> Oman, *Art of War*, 80.

<sup>44</sup> Miller, *Swiss*, 20–24.

<sup>45</sup> Oman, *Art of War*, 83.

<sup>46</sup> *Ibid.*

losses were in the hundreds.<sup>47</sup> Once again, inadequate scouting and lack of preparation in the Burgundian camp won the day for the Swiss pike.

Undeterred by two devastating defeats, Charles reorganized his army and laid siege to the city of Nancy. In January 1477 a Swiss relief force arrived before the town. One Swiss contingent managed to emerge from the woods on the flank of the Burgundians while the main body launched a frontal attack. The Burgundians were unable to react to the flanking maneuver, and the result was a total rout where Charles the Bold lost his life.<sup>48</sup>

By the end of the fifteenth century we can see that the Swiss had fully developed what we could call a new “system” of approaching battle. Although the way they approached each battle had its own variations, a general pattern of tactical deployment and engagement can be seen. Machiavelli, writing in 1519, describes the equipment of the Swiss infantry as primarily consisting of men with steel breastplates carrying seventeen-foot-long pikes, and swords with rounded points.<sup>49</sup> They had sections of armored men armed with six-foot-long halberds, and sections of *arquebusiers*.<sup>50</sup> The Swiss usually divided their army into three columns that deployed in the battlefield as three large tight squares in an echeloned manner. The first formation would initiate contact with the enemy, the second would be placed to the right and slightly behind, and the third square would be placed behind the other two, within a distance that would enable it to maneuver forward in case the two other squares were pushed back.<sup>51</sup> The Swiss became almost invulnerable to heavy cavalry charges, and they were able to withstand artillery fire by rushing the field against the enemy cannon, thus minimizing the number of salvos that the enemy could fire against them.

Throughout their conflicts with Milan in the fifteenth century, the Swabian War (1499), and the initial stages of the Italian Wars (1494–1515), the Swiss were successful against every rival. The high

<sup>47</sup> Ibid., 84–86 and Miller, *Swiss*, 26–28.

<sup>48</sup> Oman, *Art of War*, 86–87.

<sup>49</sup> Machiavelli, *Art of War*, 597.

<sup>50</sup> This was the weak point of the Swiss armies. The number of arquebuses within their ranks was comparatively small. At the battle of Marignano, for example, only about 5% of the combatants had firearms. N. Le Roux, *1515, L'Invention de la Renaissance* (Paris: Armand Colin, 2015), ch. 8.

<sup>51</sup> Ibid., 628–629.

point of the Swiss military achievement might be the Battle of Novara in 1513, when the Confederates, supporting the Duchy of Milan, defeated a numerically superior French army. The French commander, Louis de La Trémoille (1460–1525), had cornered the Milanese duke, Massimiliano Sforza (1493–1530), inside the city.<sup>52</sup> After a column of about 7000 Swiss arrived in Novara to join the 4000 already inside the city, Trémoille decided against laying siege to the city and departed.<sup>53</sup> The Swiss pursued the French army and caught up with them at Ariotta. Even though the Confederates suffered significant casualties from artillery fire, their discipline and swift advance did not allow time for the French to mount an efficient defense. The French cavalry never deployed, and the only strong resistance came from a contingent of 6000 *Landsknechte*.<sup>54</sup> As the two foes interlocked pikes, the Swiss halberdiers moved forward through the ranks and forced the German mercenaries to retreat, losing half of their numbers in the process.<sup>55</sup>

The success of the Swiss was such that by the time of the Italian Wars large numbers of them were being routinely hired as mercenaries by the different actors in the conflict, in recognition of their value on the battlefield. When French King Charles VIII invaded the Italian Peninsula in 1494, he had 10,000 Swiss and German mercenaries among his forces.<sup>56</sup> However, by the dawn of the sixteenth century a series of changes in warfare that had emerged in earlier decades were now beginning to show an effect. The fact that the French employed large numbers of Germans along with Confederates meant that some of the Swiss methods had now extended beyond the Alps. The German mercenaries who came to be known as *Landsknechte* had now adopted the pike, the halberd, and the general structure and tactics of the Swiss.<sup>57</sup> Furthermore, since the mid-fifteenth century the French and the Burgundians had been improving the design, manufacture, and use of firearms. The Swiss had captured a large number of field guns during

<sup>52</sup> Julius Norwich, *A History of Venice* (New York: Vintage Books, 1982), 428.

<sup>53</sup> M. Mallet and C. Shaw, *The Italian Wars, 1494-1559* (Harlow, UK: Pearson, 2012), 121.

<sup>54</sup> *Ibid.*, 122.

<sup>55</sup> Oman, *Art of War*, 89–90.

<sup>56</sup> Victor G. Kiernan, “Mercenaries and Absolute Monarchy,” *Past and Present* 11 (1957), 66–86.

<sup>57</sup> The first contingents of *Landsknechts* were created by Emperor Maximilian in the late fifteenth century. Oman, *Art of War*, 89.

their wars against Charles the Bold, but their use in battle had been limited. They never won a battle because of their use of artillery or hand-held firearms. It is evident that the main element in the Swiss victories in the fifteenth century was overwhelmingly their skillful use of pike and halberd in defense and attack, fueled by an extraordinary *esprit de corps*. That strong spirit was no longer enough when the Confederates, overconfident from their success at Novara,<sup>58</sup> confronted the French once again at Marignano in 1515. During this battle the Confederates, once again nominally fighting on behalf of the Duke of Milan, confronted the French army (commanded by King Francis I) and its Venetian allies. The French army deployed into three sections (each section containing infantry, cavalry and artillery). According to Guicciardini, the Swiss arrived in a solid formation from Milan and immediately launched a frontal assault, only two hours before nightfall.<sup>59</sup> The initial charge of the Swiss overcame part of the French artillery and took them to the trenches of the enemy camp. However, the onset of darkness and fierce French resistance forced the Swiss to break off the combat and rest for the remainder of the night. This informal truce gave the French king the opportunity to emplace his remaining artillery in a favorable position.<sup>60</sup> When the battle renewed at dawn, the Swiss were caught between the fire of French cannons and the arrows of Gascon archers when they charged frontally against the infantry. When the battle was at its fiercest, the light cavalry of the Venetian commander Bartolomeo d'Alviano (1455–1515) arrived on the battlefield and attacked the massive Swiss formation from the rear. After hours of combat and seeing that it was impossible to break through the French lines, the Confederates retreated from the battlefield back to Milan. The Swiss lost between 8000 and 14,000 men, and French casualties are estimated between 3000 and 6000.<sup>61</sup>

Marignano marks the end of Swiss military ascendancy. Aside from forcing the Swiss to sign a perpetual peace with France and abandon the

<sup>58</sup> Guicciardini records that prior to the battle of Marignano the bishop of Sion gave an impassioned speech to the Confederates in which he reminded them of how they crushed the French at Novara, even though they lacked cavalry and artillery. Based on their consistent record, the Swiss had a good reason to think that should be victorious at Marignano. Guicciardini, *Storia d'Italia*, Libro XII, XV.

<sup>59</sup> Ibid.

<sup>60</sup> The French king also reorganized his infantry into smaller formations and the cavalry into squadrons. Ibid.

<sup>61</sup> Ibid.

Confederacy's ambitions upon Milan,<sup>62</sup> the battle showed that Swiss tactics had not adapted to technological changes on the battlefield. During the battle, Francis I (1494–1547) was able to deploy at least 60 guns, whereas the Swiss only had about ten.<sup>63</sup> Nicolas Le Roux points out that this was the first time that such a great number of guns were used in an open battle; this was also the first time that the guns were mobile and redeployed during the battle.<sup>64</sup> Guicciardini believed that the French could not have won at Marignano without the use of artillery.<sup>65</sup> The battle also showed that European armies could rely on the *Landsknechte* to fight the Swiss in their own terms. As the sixteenth century advanced, European armies would rely increasingly on the *Landsknechte* to fill the ranks of their armies.

The success of the Swiss on the battlefield from Mortgarten in 1315 to Novara in 1513 was consistent and overwhelming.<sup>66</sup> Over the course of two centuries the Swiss adapted to new challenges, adopted new weapons, evolved tactically and operationally, and developed a long-term strategy that enabled them to achieve their geopolitical objectives. One may ask, then, why the Burgundians, the Italians, or the French did not adopt Swiss military ways. Obviously they understood the effectiveness of the system, since they consistently relied on Swiss mercenaries well into the sixteenth century. What we need to understand is that the success of the Swiss is connected to their peculiar geography, their military traditions, their organizational skills, and their idiosyncratic social and political institutions.<sup>67</sup> The coincidence of all these factors did not exist in Burgundy, Italy, or France, and therefore they could not reproduce the Swiss model of waging war, just as in ancient times the Persians could never copy the Greek phalanx and had to resort to hiring Hellenic mercenaries. While the *Landsknechte* fulfilled a function similar to that of the Swiss, they were purely mercenaries, selling their services to different

<sup>62</sup> Mallet, *Italian Wars*, 130.

<sup>63</sup> Le Roux, *L'Invention*, ch. 8.

<sup>64</sup> *Ibid.*

<sup>65</sup> Guicciardini, *Storia d'Italia*, XII, XV.

<sup>66</sup> While Marignano was a devastating defeat for the Swiss, Guicciardini writes that they were able to retire from the field in good order and even carried with them the French guns that they captured in the initial charge. *Ibid.*

<sup>67</sup> Machiavelli attributes the Swiss method of fighting to their poverty (and therefore their inability to raise an army of horses) and their desire to live free. Machiavelli sees the Swiss tactics as a revival of ancient practices, but there is no evidence that the Swiss used classical historical or literary sources as a reference for their fighting methods. Machiavelli, *Prince*, II, 597.

princes without the pursuit of any political goals. A sustained and lasting change in military affairs cannot be carried out unless it is accompanied by political direction and strategic purpose. These two factors would be at the center of the military reforms carried out by the Spanish monarchies in the fifteenth and sixteenth centuries.

While the Swiss were conducting campaigns down the sub-Alpine valleys of Italy and the plains of Lombardy, the kingdoms of Castile and Aragon were waging the final stages of a conflict whose purpose was to eliminate the last Islamic state on the Iberian Peninsula. Isabella of Castile (1451–1504) and Ferdinand II of Aragon (1452–1516) conducted a systematic attack against the Muslim kingdom of Granada from 1482 to 1492. This protracted conflict produced men who would later fight on the fields of Italy, Mexico, and Peru, including El Gran Capitán, Gonzalo Fernández de Córdoba (1453–1515).

The kingdoms of the Iberian Peninsula had been perpetually engaged in combat throughout the Middle Ages, driven particularly by their hostility against the Iberian Muslim states (whom they regarded as an occupying force). Iberian Christians adopted the Western European methods of fighting. The mounted knight became emblematic of the Reconquista, and the cavalry charge was a common practice in battle. However, the Reconquista was an unusual conflict and also produced distinct military traditions and practices. One can think of the Almogavars from the Crown of Aragon, mountaineers who, serving as light infantrymen, went on to distinguish themselves in Greece and Anatolia with the Catalan Company.<sup>68</sup> The conquest of Granada was a transitional conflict, both medieval and modern in nature.<sup>69</sup> Ideologically, the war was a continuation of the 800-year struggle against Islam; in one sense this campaign was to be the last crusade, but at the same time it was the campaign that would enable Castile (and Spain) to launch a quest for European

<sup>68</sup> One of the most remarkable actions of the Catalan Company during their eastern campaigns was the battle of Cephissus in 1311, when the Iberians defeated the Duchy of Athens. This was one of those unusual medieval battles in which infantry defeated an army heavily composed of cavalry. The victory of the Almogavars was overwhelming; according to Francisco de Moncada, out of 700 knights in the Frankish army only two survived. Francisco de Moncada, *Expedición de los Catalanes y Aragoneses contra Turcos y Griegos*, LXV (Biblioteca Virtual Miguel de Cervantes, <http://www.cervantesvirtual.com/obra-visor-din/expedicion-de-los-catalanes-y-aragoneses-contra-turcos-y-griegosDOUBLEHYPHEN0/html>).

<sup>69</sup> Miguel Ladero Quesada, *Castilla y la Conquista del Reino de Granada* (Granada: Diputación Provincial de Granada, 1993), 35.

hegemony and a worldwide empire. Very often the campaign against Granada was a war of attrition involving raids deep into enemy territory.<sup>70</sup> Throughout the conflict the Spaniards employed the *cabalgada*, a sort of “reconnaissance in force” involving a significant number of horsemen penetrating deep into enemy territory with the purpose of capturing treasure and prisoners.<sup>71</sup> Another tactic was the *tala*, in which a large army of knights and infantrymen entered enemy territory in order to engage in a formal battle every year.<sup>72</sup> And since Granada had a number of fortified strongholds, the war was also a war of sieges. And here is where we see medieval warfare coexisting with modernity. Starting in 1485 the armies of Castile began to produce and accumulate a large number of artillery pieces. The Castilians also began to build large stores of ammunition and gunpowder.<sup>73</sup> Ladero Quesada points out that in 1479 there were only four artillerymen on the royal payroll of Castile, but by 1482 there were 65.<sup>74</sup> A wide variety of firearms of different sizes and calibers were utilized during the many sieges of the Granadine campaign, alongside medieval siege towers and mantlets.<sup>75</sup> The war of Granada was indeed a conflict of transitions, and both Castilians and Aragonese learned valuable lessons in organization, strategy, and tactics.

The capture of Granada in 1492 enabled the Catholic kings to concentrate all their resources when their French counterpart, Charles VIII, invaded Italy in 1494. The first stage of the Italian Wars would force the Spanish rulers to carry out reforms that would eventually make Spain the dominant power of Europe. Rene Quatrefages points out that the Spanish army that emerged out of the Italian Wars was the product of two parallel efforts: The first was a series of administrative measures and decrees (*ordenanzas*) issued between 1492 and 1503; the second was the experience

<sup>70</sup> Alfonso de Palencia provides a detailed account of these actions. In 1489, for example, a squad of 250 horsemen (presumably knights) and 500 foot-soldiers marched deep into the territory of Guadix using difficult mountain paths in order to conduct a raid against Muslim villages and towns. During this action the Christian force killed 300 Moors and brought back several herds of sheep. This type of operation would be an important part of the Spanish campaign in the Kingdom of Naples during the 1490s. Alfonso de Palencia *Guerra de Granada*, Libro IX ([http://www.cervantesvirtual.com/obra-visor-din/guerra-de-granadaDOUBLEHYPHEN0/html/feea932c-82b1-11df-acc7-002185ce6064\\_5.html](http://www.cervantesvirtual.com/obra-visor-din/guerra-de-granadaDOUBLEHYPHEN0/html/feea932c-82b1-11df-acc7-002185ce6064_5.html)).

<sup>71</sup> *Ibid.*, 33.

<sup>72</sup> *Ibid.*

<sup>73</sup> Nancy Rubin, *Isabella of Castile: The First Renaissance Queen* (Lincoln, NE: ASJA Press, 1991), 221.

<sup>74</sup> Ladero Quesada, *Castilla*, 189.

<sup>75</sup> *Ibid.*, 183.

acquired by commanders (such as Gonzalo Fernández de Córdoba, Gonzalo de Ayora, and Pedro Navarro) in the battlefields of Italy and the Roussillon during the same period.<sup>76</sup> While the War of Granada was a resounding success, it also highlighted many of the deficiencies in the Spanish military system (especially in terms of recruitment needs and logistics), and this led Ferdinand and Isabella to carry out substantive reforms under the advice of Alonso de Quintanilla (c. 1420–1500).<sup>77</sup> There is then a conscious effort on the part of the Catholic monarchs to not simply develop new weapons, adopt new formations, and implement better battle tactics, but to establish a fully refurbished military system that would enable them to carry out an ambitious foreign policy strategy. The appointment of Quintanilla is significant because he was part of the intellectual circle of the humanist Alfonso de Palencia (1423–1492), who in 1459 had produced a book entitled *Tratado de la Perfección del Triunfo Militar* (*A Treatise on the Perfection of Military Victory*).<sup>78</sup> In this work Palencia decries the state of military affairs in Spain and puts forward a vision that will enable his sovereigns to project Spanish power onto a European stage. Palencia's work is ideological, but it also contains practical advice. At the center of the recommendations issued by Palencia is giving more prominence to the *peones* (foot-soldiers) on the battlefield, inspired perhaps by his humanistic admiration for Roman military models. Quatrefages believes that Palencia's military conception prefigures the tactics that would be adopted by the fabled Spanish *tercios* in the following century.<sup>79</sup>

In 1493, under Quintanilla's direction, the monarchy carried out the reconstitution of the old "Guardias Reales" as the "Guardias de Castilla."<sup>80</sup> This contingent was envisioned as the core of a permanent armed force.<sup>81</sup> In 1495 the Spanish crown promulgated a decree ordering that all inhab-

<sup>76</sup> Rene Quatrefages, "La Organización Militar de los Siglos XV y XVI," *Actas de las II Jornadas Nacionales de Historia Militar* (Málaga: Universidad de Cádiz, 1993), 14–16.

<sup>77</sup> Rene Quatrefages, "Genesis de la Historia Militar de España," *Militaria, Revista de Cultura Militar* 7 (1995), 61.

<sup>78</sup> Quatrefages, *La Organización Militar de los Siglos XV y XVI*, 14.

<sup>79</sup> *Ibid.*

<sup>80</sup> The guard consisted of 2500 men-at-arms, probably in imitation of the accomplished French *gendarmes*. Quatrefages, *Genesis*, 62.

<sup>81</sup> The idea of a permanent Spanish army first emerged in 1476 when the Catholic Monarchs established the Santa Hermandad with the purpose of maintaining public order within the kingdoms of Castile and Aragon. Miguel Ladero Quesada, *Ejércitos y Armadas de los Reyes Católicos, Nápoles y El Rosellón (1494-1504)* (Madrid: Real Academia de la Historia, 2010), 164.

itants of Spain (except members of the clergy) arm themselves with weapons that were within their economic means to acquire.<sup>82</sup> More pertinent to the discussion of a Military Revolution, in 1497 another *ordenanza* established the adoption of the pike and the division of a company into a section of pikemen (replacing men with spears), a section of *escudados* (men with shields and swords), and a section combining crossbowmen and men with firearms.<sup>83</sup> It is evident that these reforms were inspired by the Spaniards' familiarity with the tactics of the Swiss Confederates. Helvetic mercenaries, in small numbers, had participated in the conquest of Granada since 1482.<sup>84</sup> The *Ordenanza* of 1503 explicitly orders the infantry to be armed and to fight according to the Swiss fashion.<sup>85</sup> Furthermore, the new infantry formations were to consist of two thirds of pikemen and one third of crossbowmen and *espingarderos*.<sup>86</sup> Ironically, the Spanish crown decided to officially adopt the "Swiss model" the very same year that Gonzalo Fernández de Córdoba, El Gran Capitán, was beginning to test the viability of that military paradigm at Cerignola.

The Battle of Cerignola seems to be a historical watershed when all the diverse military traditions, technical developments, and tactical lessons of the previous century converged. The Spanish army, led by Fernández de Córdoba, consisted of 5500 infantrymen (including 2000 *Landsknechte*), 1500 cavalry and thirteen artillery pieces.<sup>87</sup> The French forces, commanded by the Duke of Nemours, consisted of 500 men-at-arms, 500 light horse, 4000 Swiss and Gascons, and additional Italian contingents totaling 3200 men.<sup>88</sup> When Fernández de Córdoba arrived in the vicinity of

<sup>82</sup> Ibid., 63.

<sup>83</sup> Ibid., 64.

<sup>84</sup> Ibid., 221–222.

<sup>85</sup> Quatrefages, Génesis, 64.

<sup>86</sup> The espingarda was a hand-held firearm that was the precursor to the arquebus. Ibid.

<sup>87</sup> Jerónimo Zurita, *Historia del Rey Don Hernando el Católico, de las Empresas y Ligas de Italia*, Libro V, XXVII (<http://web.archive.org/web/2007121209121554/http://www.dpz.es/ifc2/libros/2584/ebook2584.asp>). Other chronicles provide slightly larger number for the Spanish forces and exaggerated numbers for the French; however, they coincide on the number of *Landsknechts* and Swiss pikemen.

<sup>88</sup> A general outline of the battle can be reconstructed from similar accounts in several sixteenth-century chronicles. See *Crónica General del Gran Capitán* Libro II, LXXVI, 161; *Crónica Manuscrita* Libro VI, XVI, 367; and Paolo Giovio *La Vida y Crónica de Gonzalo Hernández de Córdoba llamo por sobrenombre El Gran Capitán*, Libro II, 519–520 in *Crónicas del Gran Capitán*, ed. A. Rodríguez Villa (Madrid: Librería Editorial de Bailly/Bailliere, 1903).

Cerignola, he found a landscape of vineyards and olive groves surrounded by fences. Taking advantage of the terrain, the Spanish started to dig deep and wide trenches and to build improvised earthworks to shield the infantry (with the artillery placed behind them on higher ground).<sup>89</sup> As the French launched a frontal cavalry charge against the Spanish center, 800 *Landsknechte* armed with arquebuses and divided into four squadrons opened fire. On the wings, El Gran Capitán had placed his cavalry. After the failure of the French to overtake the *Landsknecht* lines, they shifted their attack to the enemy's right where they found equally strong resistance from the Spanish infantry. After the failure of the French cavalry, the Swiss tried to advance, but their charge was also broken by the terrain, fire from the Spanish *arquebusiers*, and the pikes of the *Landsknechte*.<sup>90</sup> At this point the Spanish cavalry charged the now-disorganized French army and sealed the outcome of the battle. Cerignola was a devastating defeat for the French; the Duke of Nemours lost his life along with 4000 of his men.<sup>91</sup> This Spanish victory would be the first major encounter in which many elements of the modern warfare would come together. Cerignola was a victory of infantry against cavalry; it was a battle of pikemen in which the *Landsknechte* showed that they could hold their ground against the Swiss; it was a battlefield where, for the first time, concentrated arquebus fire had a decisive effect; and it was also a battle in which the rapid construction of trenches, field fortifications, and emplacements annulled the mobility of the enemy.<sup>92</sup>

While El Gran Capitán was cementing his military reputation in Italy, another important conflict was taking place along the French–Spanish border, in the Aragonese province of Roussillon. This war involved thousands of soldiers on both sides, but there were no major field battles. Instead, the campaign was characterized by sieges of fortresses and *cabalgadas*, reconnaissance-in-force missions carried out by mixed contingents of cavalry and infantry.<sup>93</sup> The most memorable event in this war was the

<sup>89</sup> Ibid.

<sup>90</sup> Ibid.

<sup>91</sup> Giovio, *Vida*, Libro II, 520.

<sup>92</sup> It should be noted that artillery did not play an important role in the battle. The French cannon were emplaced in a position where they could not do damage to the Spanish forces, and the Spanish artillery suffered an unfortunate accident that blew up all the ammunition and gunpowder available to them, prompting The Great Captain utter his famous phrase: "I have seen the luminaries of victory." Giovio, *Vida*, Libro II, 520.

<sup>93</sup> Ladero Quesada, *Ejércitos*, 274.

siege of Salsas. This fortress, under the command of Sancho de Castilla, resisted the siege of 13,000 French troops for several weeks until it was relieved by the armies of King Ferdinand and the Duke of Alba.<sup>94</sup> It was during one of the actions around Salsas that Gonzalo de Ayora convinced the Duke of Alva to use a formation that included placing the cavalry on the wings, with the artillery and infantry in the middle, deployed in the manner of the Swiss armies.<sup>95</sup> While lacking the dramatic character of the Italian conflict, the war in Roussillon was equally significant because it also served as a laboratory for new tactics and operational models for the Spanish forces.<sup>96</sup>

Following Cerignola, at the battle of Garigliano Fernández de Córdoba consolidated his reputation as the most innovative commander of the period. While attempting to advance towards French-occupied Gaeta, El Gran Capitán saw his progress threatened by the army of the Marquis of Saluzzo.<sup>97</sup> At that point, Fernández de Córdoba resolved to prevent the French from crossing the Garigliano River and advancing towards his fortified positions around San Germano. During the initial phase of the battle the French were able to cross the only bridge on the river, but they were pushed back by the Spaniards, who crossed the bridge in the opposite direction. In the meantime, El Gran Capitán had sent a group of men upriver in order to build a pontoon bridge that would be used to bring Spanish troops (both horse and foot) with the purpose of falling upon the exposed French flank. Attacked on two sides, the French abandoned their artillery and retreated in disorder. At several points in the retreat the French tried to regroup and confront the Spaniards, but the latter kept pushing them back all the way to Gaeta.<sup>98</sup> The defeat at Garigliano made the French position at Gaeta untenable. The evacuation of Gaeta soon followed and marked the failure of the French Neapolitan adventure.<sup>99</sup>

<sup>94</sup> *Crónica General del Gran Capitán*, Libro II, XCIX, 196–199.

<sup>95</sup> Serafin María de Sotto, Conde de Clonard, *Historia Orgánica de Infantería y Caballería Españolas* (Madrid: Castillo, 1851), 408.

<sup>96</sup> Gonzalo de Ayora was a Spanish commander and official chronicler of the kingdom present during the Roussillon campaign. His letters to the king and other royal officials provide a detailed view of the operations in this theater of the war against France and his ideas regarding military reform. See: Gonzalo de Ayora, *Cartas de Gonzalo de Ayora, Cronista de los Reyes Católicos* (Madrid: Imprenta Sancha, 1794).

<sup>97</sup> Zurita, Libro V, LVII.

<sup>98</sup> *Crónica General del Gran Capitán*, CIII-CX, 208–219.

<sup>99</sup> *Ibid.*, CX.

More than a battle, Garigliano should be viewed as a military operation on an extended front that over the course of several days involved individual actions of diverse nature: capturing bridges, a decoy action, the building and crossing of a pontoon bridge, a flanking maneuver, and engaging and pursuing the enemy across several rivers. The engagement involved the rapid deployment of cavalry (heavy and light), infantry (Spanish and *Landsknechte*), and artillery, as well as swift action by engineers. Garigliano was indeed a precursor to the types of actions that the Spanish army would employ and become famous for in the Netherlands and other military theaters over the course of the sixteenth century.

The collapse of the French presence in Naples and their expulsion from Roussillon allowed the Spanish crown and its commanders to reevaluate the effectiveness of their armies. It is at this time that we start to see the organizational reforms that would imprint the particular character of the Spanish forces in the next century and a half. The *ordenanza* of 1496 had created companies that combined pikemen, sword-and-shield foot soldiers, crossbowmen, and *arquebusiers*. These were the troops that went into the Roussillon in 1503 to engage the French invading army.<sup>100</sup> These troops were organized into tactical units called *capitanías*, and in 1505 Gonzalo de Ayora (1466–1538), chronicler and advisor to the monarchs, became captain of one of these contingents. In this role Ayora was able to put into practice many of his reforming ideas.<sup>101</sup> Ayora realized that the *capitanía* (with a compliment of about 100 men) was not strong or large enough to operate independently on the battlefield. Therefore, he proceeded to organize a larger unit called *colunela*, composed of several companies. These units were of temporary character, only formed for specific actions on the battlefield, and their numbers were not fixed (oscillating between 800 and 1500).<sup>102</sup> Eventually the name *colunela* would be transformed into *coronelia*, and as such these units would become the main tactical unit of the Spanish armies during the first decades of the sixteenth century. In Italy, Fernández de Córdoba, building upon his experience in recent successful campaigns, carried out reforms of his own. He established *coro-*

<sup>100</sup> De Soto, 394.

<sup>101</sup> *Ibid.*, 411.

<sup>102</sup> De Soto points out that this reorganization of tactical units coincided with the arrival in Spain of 3000 *Landsknechte* accompanying the new rulers of Castile, Juana and Phillip the Handsome. *Ibid.*, 413.

*nelias* that were divided into twelve companies of 500 men each.<sup>103</sup> Each company contained 200 pikemen, 100 arquebusiers and 200 *coseletes* (buckle-and-sword men).<sup>104</sup> The *coronellias* were eventually reduced in size to around 3000, and at this point these units begin to resemble the more familiar *tercio*.<sup>105</sup> The significance of these reforms is that, whether we are talking about Ayora or Fernandez de Córdoba, the Spanish commanders were beginning to think of these infantry units not only in tactical but also in operational terms. This basic organization would endure well into the sixteenth century and would bring the Spanish monarchy countless victories. Throughout the sixteenth century the number of arquebusiers in the units kept increasing, and by 1567 muskets (firearms of greater caliber and longer range) had been introduced into the units.<sup>106</sup> However, when Sancho de Londoño's *Discurso sobre forma de reducir la Disciplina Militar a mejor y antiguo estado* was published in 1589, his description of the *tercio* (as well as its armament and tactics) was not very different from the types of units that were being deployed at the battles of Bicocca or Pavia in the 1520s—although he points out that the number of soldiers has been reduced from 3000 to 1500.<sup>107</sup> In Diego de Salazar's *De Re Militari*, published in 1582, the author describes multiple ways of arranging pikemen, arquebusier and *coseletes* within a *tercio*.<sup>108</sup> This is a practical manual with innovative ideas to help commanders deploy their troops in an effective manner, but it does not contain a new conceptualization of warfare, the battlefield, the tactical unit, or the soldier. In fact, Salazar writes the treaty in the form of a dialogue where one of the interlocutors is El Gran Capitán, a conscious acknowledgement of de Córdoba's role in developing the prevailing infantry tactics. There is a proliferation of these types of treatises in Spain in the late sixteenth century.<sup>109</sup> These works are expressions of

<sup>103</sup> Francisco Arias Marco, "Aclaraciones en torno a las coronellias y los tercios" in *Actas de las II Jornadas Nacionales de Historia Militar* (Málaga: Universidad de Cádiz, 1993), 218.

<sup>104</sup> Two of the companies were composed exclusively of select pikemen. *Ibid.*

<sup>105</sup> The term "tercio" is officially established only in 1536 in the Ordenanzas the Genova.

<sup>106</sup> Arias, *Aclaraciones*, 219.

<sup>107</sup> Sancho de Londoño, *Discurso sobre la forma de reducir la Disciplina Militar a mejor y antiguo estado*, 1589 (<http://www.vallenajerilla.com/berceo/antoninoperez/reducirdisciplinalondono.htm>).

<sup>108</sup> Diego de Salazar, *Tratado De Re Militari* (Brussels: Roger Velpius, 1590).

<sup>109</sup> Saul Martínez Bermejo, "Antigua disciplina: el ejemplo romano en los tratados militares ibéricos, c. 1560-1600," *Hispania, Revista Española de Historia* 74:247 (2014).

late humanism, and they mistakenly place the tactical development of infantry within the context of the revival of classical models of warfare; they often see the *tercios* as the re-adaptation of the Roman legions or the Hellenic phalanxes. At the same time, these tracts show that by the end of the sixteenth century infantry tactics had achieved a form of standardization, that the modern way of fighting, which crystallized over the course of the Italian wars, had become a model that could be taught, learned, and reproduced. It also means that this model could be modified, adapted to new contexts and improved. And this is precisely what we see taking place with the ideas of Maurice of Nassau and Gustavus Adolphus. The infantry reforms of the late sixteenth century and early seventeenth century cannot be viewed as departures from obsolete practices but rather as modifications of tactical models that had proved successful. Lutzen, Breitenfeld, the Dunes, and even Rocroi (the battle where the “last *tercio*” gloriously fell) must be understood (along with White Mountain and Nordlingen) as the peaks of waves in a long continuum of innovation, change, and adaptation that has no clear beginning but seems to have assumed a definable shape by the 1520s.

Several historians, focusing on different time periods, have shown that all ages are full of military adaptations that had tremendous social, political, and economic consequences.<sup>110</sup> Despite this interrelationship, it was always the introduction of new technologies that stimulated military progress. New technology was a threat to those who anticipated engaging in military campaigns, and so led to general anticipatory reforms. It was one such new technology, gunpowder, that finally changed the whole military system, eventually leading to new mass armies, first tested during the Thirty Years’ War (1618–1648). At the beginning, the state was not capable of waging such large-scale war, a fact that paved the way for people like Albrecht von Wallenstein (1583–1634), who may be seen as the first military entrepreneur of Europe. Additionally, as Kaempffert stated in 1941,

It was the discovery and the military use of gunpowder that gave science and technology their impetus—a discovery which did quite as much as the invention of movable type and the steam engine to change the structure of

<sup>110</sup>See the report on a recent conference on the interrelationship of technology and warfare at the University of Würzburg (Germany), which is available at the following URL: <http://hsozkult.geschichte.hu-berlin.de/tagungsberichte/id=5466> (last access, October 31, 2014).

society, to give it new purpose and direction, and to lay the foundations of engineering and mass production.<sup>111</sup>

He continues by drawing a comparative line between the Military Revolution and its industrial predecessor:

Military history merely parallels industrial history. Both in industry and in war men are regimented. Everywhere there is system—system in reconnoitering from the air, firing shells from a battery, building an airplane, preparing and packaging a breakfast food. Innovations can be introduced in the midst of war only on a small and experimental scale, as in the case of gas, the tank, and armored vessels.<sup>112</sup>

While his perspective was highly influenced by the events of the Second World War (1939–1945), he also recognized the impact of the Industrial Revolution on the scope of warfare itself, because “the musket, the cannon, the machine gun are labor-saving devices in precisely the same sense that a steam shovel is a labor-saving device.”<sup>113</sup> That killing would become dishonorable work mainly determined by modern technologies was already visible during the last wars of the nineteenth century. Even Carl von Clausewitz, writing in the early nineteenth century, had known that a combination of power and technology would lead to a more complex situation. He described the interrelationship in his famous work *On War* in the following way:

The choice between these terms seems to be still unsettled, and no one seems to know rightly on what grounds it should be decided, and yet the thing is simple. We have already said elsewhere that “knowing” is something different from “doing.” The two are so different that they should not easily be mistaken the one for the other. The “doing” cannot properly stand in any book, and therefore also Art should never be the title of a book. But because we have once accustomed ourselves to combine in conception, under the name of theory of Art, or simply Art, the branches of knowledge (which may be separately pure sciences) necessary for the practice of an Art, therefore it is consistent to continue this ground of distinction, and to call everything Art when the object is to carry out the “doing” (being able), as

<sup>111</sup>Waldemar Kaempffert, “War and Technology,” *American Journal of Sociology* 46:4 (1941), 432.

<sup>112</sup>Ibid., 442.

<sup>113</sup>Ibid., 443.

for example, Art of building; Science, when merely knowledge is the object; as Science of mathematics, of astronomy. That in every Art certain complete sciences may be included is intelligible of itself, and should not perplex us. But still it is worth observing that there is also no science without a mixture of Art. In mathematics, for instance, the use of figures and of algebra is an Art, but that is only one amongst many instances. The reason is, that however plain and palpable the difference is between knowledge and power in the composite results of human knowledge, yet it is difficult to trace out their line of separation in man himself.<sup>114</sup>

However, it was the First World War that created a new sphere of technologically-driven mass killings. In this sense, the events of 1914–1918 also created a Military Revolution.

As early as the Russo–Japanese War (1904–1905), observers and soldiers alike could experience the new level of industrialized warfare. Sakurai Tadayoshi (1879–1965) described the modern battlefield in very vivid terms:

The sublimity of battle can only be seen in the midst of showers of bullet and shell, but the dismal horror of it can best be observed when the actual struggle is over. The shadow of impartial Death visits friend and foe alike. When the shocking massacre is over, countless corpses covered with blood lie long and flat in the grass and between stones. What a deep philosophy their cold faces tell! When we saw the dead at Nanshan, we could not help covering our eyes in horror and disgust. But the scene here, though equally shocking, did not make us shudder half so much. Some were crushed in head and face, their brains mixing with dust and earth. The intestines of others were torn out and blood was trickling from them. The sight of these things, however, did not horrify us very much.<sup>115</sup>

He continued by describing an impression from the battlefield after the fighting was over. His testimony underlined the cruelties of war in the twentieth century long before Verdun.

After this battle we captured some machine-guns; this was the firearm most dreaded by us. A large iron plate serves the purpose of a shield, through which aim is taken, and the trigger can be pulled while the gun is moving

<sup>114</sup> Carl von Clausewitz, *On War*, vol. 1 (London: Kegan Paul, 1908), 119.

<sup>115</sup> Sakurai Tadayoshi, *Human Bullets. A Soldier's Story of Port Arthur* (Boston/New York, Houghton, Mifflin & Company, 1907), 149.

upward, downward, to the left, or to the right. More than six hundred bullets are pushed out automatically in one minute, as if a long, continuous rod of balls was being thrown out of the gun. It can also be made to sprinkle its shot as roads are watered with a hose. It can cover a larger or smaller space, or fire to a greater or less distance as the gunner wills.<sup>116</sup>

That the enemies were skilled with the new technology was obvious when Sakurai and his comrades found a dead soldier who had been hit by more than 70 bullets.<sup>117</sup>

The First World War witnessed numerous military revolutions, especially since new technologies were introduced in a much faster way. The scientist became a servant of destruction, and larger cannons with a longer range were driven to an ever higher efficiency in killing. The evolutionary process itself became faster, because wars had become industrialized in every aspect. Industrialization meant the acceleration of all processes of production, including the war machine. The Great Powers tried to overcome each other in the trench war, something that was not achievable by higher manpower or a stronger spirit. What was needed was a technology that could provide superiority. Gas, machine guns, tanks, planes, submarines—the technological development was speedy, especially since the fear of losing the war was an existential one for all army staff. The twentieth century is consequently full of military revolutions, if we still wish to use the concept.

Andrew N. Liaropoulos states that

A historical approach to the study of war (and therefore to the study of Revolutions in Military Affairs) would treat war as a social phenomenon, focusing on periodical transformations in the social, political, and cultural forces.<sup>118</sup>

For him, revolutions in military affairs are “conceptual in nature and not technological;” however, we have shown above that there is usually

<sup>116</sup> Ibid., 152.

<sup>117</sup> Ibid., 153.

<sup>118</sup> Andrew N. Liaropoulos, “Revolutions in Warfare: Theoretical Paradigms and Historical Evidence: The Napoleonic and First World War Revolutions in Military Affairs,” *The Journal of Military History* 70:2 (2006), 365.

an interrelation between these elements that is not causative but one of mutual dependence. The First World War, as other wars before, might have created “a new style of warfare,”<sup>119</sup> but it did not change the aim of war itself. It simply produced new dimensions of warfare. To produce the needed amount of grenades, which rose from a daily production rate of 13,600 per day in 1914 to 100,000 in 1916, French industry had to mobilize all of its available workers, and civilians were actively integrated into the war industry. The same was true for the British economy, which had to produce the 1.2 million grenades that were used during the Battle of the Somme in 1917, or for the Battle of Ypres in 1917 when they needed 4.3 million grenades.<sup>120</sup> Consequently, the war was no longer a fight between armies; it became one between armories, workforces, and populations.

Technological advantages need to be kept secret, because they are decisive factors in warfare. With regard to the machine gun manual, on June 19, 1917 the United States War Department advised all officers to make sure to protect this emblem of technological superiority:

You are advised that this and all subsequent documents of a similar character, which may be furnished to you from this office, are to be regarded as strictly confidential. They are to be kept at all times in your personal possession, and are not to be copied, nor are any parts of their contents to be communicated either directly or indirectly to the press, nor to any persons not in the military or naval service in the United States. In Europe these documents are not to be carried into the front or trenches, or further to the front than the usual post of the officers to whom issued. Strict compliance with this injunction is enjoined upon every officer into whose hands any of these confidential documents may come.<sup>121</sup>

The First World War finally became a technological war, in which the human part needed to be able to control a more and more complex technical one. Another description of the equipment of a machine-gun company or troop explains this clearly:

<sup>119</sup> Ibid., 382.

<sup>120</sup> Creveld, *Gesichter*, 84.

<sup>121</sup> Army War College ed., *Machine Gun Notes*, No. 1 (Washington: Government Printing Office, 1917), 5.

Each machine-gun company or troop is provided with four guns, including tripods, ammunition, spare parts, tools, and accessories, together with the necessary packs. The equipment for each organization is carried on 20 mules, constituting 4 sections of 5 each. The sections are essentially complete units, although certain articles are not carried in every section. The equipment of each section consists of one gun, ammunition, and the necessary equipment for maneuvering the piece in the field. It is divided into the following parts:

Part I. The gun with its ammunition and accompanying parts.

Part II. The pack harness.

Part III. The special pack equipment.

Part IV. The pioneer tools.

A description of each of these parts, together with a statement of total equipment issued to one machine-gun company or troop<sup>122</sup>

was also part of the ever more complex equipment which soldiers needed to be able to use during the battles of the First World War. It became a total war of technology, but also a war that produced political revolutions as a consequence of its impact on the civil societies in the participating countries.

One aspect was the speed of technological developments, which surpassed everything before. Air fighters, tanks, submarines, and many other technologies were adapted almost hourly.<sup>123</sup> The armies desired to win the war, and therefore the enemy had to be defeated, no matter the cost. Arms races had determined the political struggles in Europe as early as the second half of the nineteenth century, but the Great War became the vivid expression of the consequences of a lost battle over a more appropriate technology. Now improvements were needed to change the outcome of a battle, which then might decide the war. The tank was created to destroy machine guns during the battle and to protect the soldiers from its deadly fire.<sup>124</sup> Consequently, one could use the term “catalyst” for the events between 1914 and 1918.

<sup>122</sup> U.S. Ordnance Department, ed., *Handbook of the Maxim Automatic Machine Gun, Caliber 30, Model of 1904 with Pack Outfits and Accessories* (Washington: Government Printing Office, 1917), 7.

<sup>123</sup> *Ibid.*, 93–97; Metz, *Ursprünge der Zukunft*, 421–427.

<sup>124</sup> *Ibid.*, 419.

However, it was not only military technologies that changed the manner of warfare. Civil technologies like the phone or chronographs were also used to better control larger armies, and technologies of observation provided much needed impressions of the enemy's movements and conditions.<sup>125</sup> Despite these inclusive elements, there was also an exclusive one. The war was brought to the homes of the ordinary people by the use of technologies like the photograph and the movie. Larger audiences were now confronted with the cruelties of war, as well as with victorious events. Regardless of the new possibilities created by the use of technology, death remained part of the fighting, even though Ivan Stanislavovich Bloch (1836–1902) had predicted that the high development of technology would end the use of large armies and their associated manpower.<sup>126</sup> Although the Great War produced almost daily peaks with regard to firepower and mobility, it also called for human sacrifice as long as the military leaders were unwilling to acknowledge the new situation of technological mass destruction.

It was the Second World War (1939–1945), beginning with Hitler's *Blitzkrieg*, that finally overcame the idea of mass armies, which were initially replaced by fast and well-trained elite tank and air fighter forces. Consequently, the events of 1939 could also be called revolutionary in a way, because Hitler had used the German economy, German politics, and the manpower of the so-called Third Reich to prepare a war that shocked Europe, especially with its first fast and successful battle tactics.

In short, with regard to our short survey of military developments in ancient, medieval, early modern, and modern periods, the term Military Revolution could be used several times. Consequently, it is not suitable to describe a process that seems more evolutionary than revolutionary, with developmental peaks occurring in those moments when there was a particular need for progress—a threat of war. We therefore have to answer a

<sup>125</sup> Manuel Köppen, *Das Entsetzen des Beobachters. Krieg und Medien im 19. und 20. Jahrhundert* (Heidelberg: Universitätsverlag Winter, 2005), 1; Dierk Spreen, *Tausch, Technik, Krieg. Die Geburt der Gesellschaft im technisch-medialen Apriori* (Berlin et al.: Argument Verlag, 1998), 11; Horst Tonn, "Medialisierung von Kriegserfahrungen," in *Kriegserfahrungen – Krieg und Gesellschaft in der Neuzeit. Neue Horizonte der Forschung*, eds. G. Schild and A. Schindling (Paderborn: Ferdinand Schöningh, 2009), 109–133, here 110.

<sup>126</sup> Ivan Bloch, *Is War Now Impossible? Being an Abridgment of the War of the Future in Its Technical, Economic, and Political Relations* (Whitefish, MT: Kessinger, 2008 [originally published 1899]).

final question: Are military revolutions indeed endless, as our short survey suggests, or are they rather part of a larger process of military progress, based on research and development, the adaption of new technologies, and their proof in practice? And would it not be better to adopt an evolutionary perspective to describe this endlessness?

## Conclusion: An Endless Evolution

**Abstract** The widespread evidence of significant military developments in technology and tactics across many geographic areas and in different historical periods lends support to a theory of a persistent, global, and endless evolutionary process in military affairs. This conceptualization of military progress should replace the notion of a unique and exclusively Western Military Revolution during the Early Modern period. The notion of a Military Revolution has outlived its usefulness as an instrument of historical inquiry.

**Keywords** Military evolution • Military theory • Anti-euro-centrism

War is a constant part of human history. Since mankind came into existence, people have tried to kill each other for economic, political, religious, or social reasons. And it seems well set to remain a constant as history progresses. New technologies have always played a role in human progress, but they can also be seen as peaks in an evolutionary process of military progress and development. Every form of progress changed the way of warfare. Killing without being killed, however, remained the sole and ultimate goal. Political centralization, the exploitation of new economic resources and the change of social conditions are natural consequences or necessary preconditions for this process of change.

Whereas the medieval army was dominated by “the fully armored, lance-bearing mounted knight” and the “battlefield was totally dominated by the combat technique of these bands of *qualifizierte Einzelkämpfern*, offensive combat at close quarters,”<sup>1</sup> this would change in the following decades when pikemen and musketeers formed larger and more dominant infantries. There was no longer a space for the elite soldier on horseback. War became socialized, commoners were able to kill noblemen, and the social impetus of warfare itself changed.<sup>2</sup> Better training methods led to professionalism<sup>3</sup> on the battlefield, and trained officers would lead larger and larger armies into the battle. However, the developments described seem to be not uniquely late medieval or early modern at all.

War itself is a collective act by people to kill other people. What seems to be a very simple explanation for war in fact lies at the root of all possible military revolutions: Driven by the aim of killing an enemy, people start to think about the means to achieve this aim without themselves being hurt. Every development in weaponry has aimed to increase the level of damage while decreasing the possible harm to the actor. Thus, the bow, later the musket, and finally the atomic bomb were invented. By further broadening the technological possibilities, mankind also widened the scope of its violence.<sup>4</sup> Trutz von Trotha (1946–2013), a German sociologist, got this interrelationship right when he stated that

Cruelty is a mirror of the living conditions and achievements of a society. It appears to be as old as humanity itself and crosses societal and cultural boundaries. No society can say that it does not allow cruelty to exist; even if societies differ to an extreme in the amount of space they give to cruelty and which forms are practiced in these particular spaces.<sup>5</sup>

<sup>1</sup> Knud J. V. Jespersen, “Social Change and Military Revolution in Early Modern Europe: Some Danish Evidence,” *The Historical Journal* 26:1 (1983), 1. On the term *qualifizierter Einzelkämpfer* (professional single fighter) see Hans Delbrück, *Geschichte der Kriegskunst im Rahmen der politischen Geschichte* (7 vols., Berlin, 1900–36), vol. 4, 137.

<sup>2</sup> Jespersen, *Social Change*, 2.

<sup>3</sup> M. D. Feld, “Military Professionalism and the Mass Army,” *Armed Forces and Society* 1:2 (1975): 191–214; M. D. Feld, “Middle Class Society and the Rise of Military Professionalism: The Dutch Army 1589–1609,” *Armed Forces and Society* 1:4 (1975): 419–442.

<sup>4</sup> Niels Bierbaumer, “Neurogeschichte von Gewalt und Kriegserfahrung,” in *Kriegserfahrungen – Krieg und Gesellschaft in der Neuzeit. Neue Horizonte der Forschung*, ed. G. Schild and A. Schindling (Paderborn: Ferdinand Schöningh, 2009), 83–107, especially 90.

<sup>5</sup> Trutz von Trotha, “On Cruelty: Conceptual Considerations and the Summary of an Interdisciplinary Debate,” in *On Cruelty, Sur la cruauté, Über Grausamkeit*, ed. J. Rösel and T. v. Trotha (Cologne: Rüdiger Köppe Verlag, 2011), 1–67, here 4–5.

This development seems to be endless. However, we can recognize that there are peaks of technological adaptation that are, like the Indian example described in an earlier chapter, closely interconnected with actual defeats or the fear of them. While some military strategists during the Great War still believed that the will of a soldier could make a difference, for example through bayonet assaults against the machine-gun-equipped enemy, others were simply not able to adopt the recent lessons of the Russo-Japanese War in the short span of the war.<sup>6</sup> Military change related to defeat is partly the consequence of the fact that most military staff members plan future wars by looking back in time. In the case of a successful campaign, they maintain the actual systems in existence, unconvinced of the need for advance.

Nowadays we experience another phenomenon, namely the end of traditional warfare between armies fighting for nation-states. We are facing a war against “terrorism,” which means a war against an invisible enemy.<sup>7</sup> These “Low-Intensity Wars”<sup>8</sup> or “New Wars”<sup>9</sup> are evidence that technological supremacy no longer assures victory.<sup>10</sup> Consequently, the military has to adapt new technologies and strategies; it has to change itself again. Modern wars are planned and prepared in laboratories and by the hackers who will determine the future of the so-called Cyber War; however, there is still sufficient time and space for further military progress, which is again not endless but part of an endless evolutionary process in which peaks represent particular needs at a particular time to make progress in a particular area. And like all evolutions, whether political, economic, social, or technological, the military impact of the process per se is part of a historical continuum.

To conclude, we will briefly answer our initial questions once again. Was the Military Revolution global? Yes, it was, and it is still a global

<sup>6</sup>Dr. Jacob is actually finishing a comprehensive study on the long-term effects of the Russo-Japanese War.

<sup>7</sup>The emergence of the so-called Islamic State in Iraq and Syria presents a variation of the paradigm since ISIS operates both as a terrorist organization and as an insurgent force holding territory.

<sup>8</sup>Martin van Creveld, *Die Zukunft des Krieges* (Hamburg: Murmann, 2004), 45–55.

<sup>9</sup>The term “New Wars” has been recently criticized: Dieter Langewiesche, “Wie neu sind die ‘Neuen Kriege’? Eine erfahrungsgeschichtliche Analyse,” in *Kriegserfabrungen – Krieg und Gesellschaft in der Neuzeit. Neue Horizonte der Forschung*, eds. G. Schild and A. Schindling (Paderborn: Ferdinand Schöningh, 2009), 289–302.

<sup>10</sup>This dilemma was already visible during the war in Vietnam, see Merle L. Pribbenow II, “The -ology War: Technology and Ideology in the Vietnamese Defense of Hanoi, 1967,” *The Journal of Military History* 67:1 (2003):175–200, especially 200.

process that cannot be limited to Europe. Therefore the term ‘evolution’ seems to be more applicable. If we retain the nomenclature of Military Revolution, we will remain ensconced in a Eurocentric historiography that is no longer sufficient to address the global context of history itself. Were there numerous revolutions? Yes, we can say that there were numerous Military Revolutions, but this makes the use of the concept obsolete, especially since the exception becomes the ordinary. What has been erroneously called Military Revolution is not a unique process but rather part of a larger process of research and development, adaptation, and evaluation: an evolution. If we use the term Military Revolution in an overly inflationary way, we have to argue that there is no Military Revolution at all. And indeed we argue that there never was a Military Revolution. Those historians who prefer to adhere to the concept are not willing to accept that there never was a holistic military supremacy on the part of the West.

Peaks in the evolutionary process of military research and development might have given the impression of a Military Revolution, but the impression is a false one, an arbitrary construct. These peaks are far more related to the driving need to achieve quick military progress to survive an actual or imminent conflict. As long as these peaks continue to exist—and they definitely will—those colleagues who believe in the concept of Military Revolutions will still have something to analyze, following their theoretical assumptions. We would prefer that the field start to compare the evolutionary processes in the Western and non-Western world in more detail and pay attention to the continuity across historical periods, so as to achieve a form of military history free from encumbering prejudice.

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