

“The great armies of the Turks may be attributed to their small skill and rare use of fighting with guns, which only some part of the Janissaries use, though they have a great store of artillery, which in like sort they cannot generally so well manage as the Christians.”

*— Fynes Moryson, Itinerary,
Seventeenth Centuryⁱ*

GUNPOWDER EMPIRE

The Mighty Ottoman Military Outpaced

CONOR MCGOVERN

THE OTTOMAN EMPIRE'S ADOPTION OF GUNPOWDER AS A WAR-WINNING WEAPON PREDATED OTHER EUROPEAN STATES AND SIGNALLED THE BEGINNING OF THE MILITARY REVOLUTION WHICH CHARACTERIZED THE EARLY MODERN ERA THAT BEGAN IN 1453 WITH THE FALL OF CONSTANTINOPLE AND ENDED AROUND 1800. HOWEVER, THE TURKISH ADVANTAGE IN ARMS WAS SHORT-LIVED, AND BY THE END OF THE ERA, THE EMPIRE'S MILITARY WAS OUTDATED AND AT THE MERCY OF ITS EUROPEAN NEIGHBORS. FOCUSING ON THE THREE MAJOR AREAS THAT CHARACTERIZED THE MILITARY REVOLUTION—ARTILLERY, FORTIFICATIONS, AND FIREPOWER—THIS PAPER EXAMINES HOW THE OTTOMAN EMPIRE'S MILITARY STAGNATED AS A RESULT OF ITS REFUSAL TO INNOVATE.

INTRODUCTION

The Ottoman Empire lasted over six centuries; like most empires, its rise was astronomical, and its decline long and drawn out. At its height in the sixteenth and seventeenth centuries it spanned three continents, stretching from Gibraltar in the west to the edge of Persia in the east, from the edge of Ukraine in the north to Somalia in the south. During those days it was one of the world's great powers, the mighty vanguard of the Muslim hordes that Christians saw knocking on the doorstep of continental Europe. Even the year that many historians set as the beginning of the modern era (if one must set a date) is inherently connected with the Turks, as 1453 marks the Ottoman conquest of Constantinople and the end of the last ancient empire in Europe.

Arthur Goldschmidt refers to the Ottomans as the greatest of the “gunpowder empires” of the early modern Middle East.ⁱⁱ One of contemporary scholarship's great debates involving the early modern period involves the notion of a military revolution, and it stands to reason that the Ottomans must have participated in such a revolution. A closer examination of Ottoman history in the context of the military revolution debate, however, is required. Unlike its Christian neighbors who became considerably stronger and more stable as time passed, the Ottoman Empire stagnated and declined, militarily and structurally, after a certain period. If, indeed, the Ottomans were a “gunpowder empire,” then what sort of role did advancing technology, and the Ottoman's use of it in a revolutionary context, play in the rise and fall of the Ottoman military? This essay will focus primarily on Rogers' infantry, artillery, and fortification revolution, as well as a further examination of the turn of the 18-century firepower revolution, to provide an answer.

THE INFANTRY REVOLUTION

First we turn towards Clifford Rogers' first stage of the military revolution, the 14th-century infantry revolution. This period, he says, was revolutionary in character on the European battlefield because it saw a switch from a focus

on heavy cavalry as the determinant factor of battle to dominant infantry wielding polearms and missile weapons capable of high maneuverability.ⁱⁱⁱ

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This switch from cavalry to infantry elite on the battlefield was achieved by the Ottoman's own elite infantry, the Janissaries, though such a change occurred later than it did elsewhere in Europe and only up to a point. The Janissaries, a unique unit created by weaning the male children of non-Muslim subjects of the Ottomans on a dose of Islam and war, were first mentioned as early as 1396, and their adoption of firearms as their weapons of choice must have occurred sometime before the 1449 Battle of Kosovo Polje, making them the first elite battle-winning infantry unit in Europe to adopt gunpowder weapons as their weapon of choice. That said, the Janissaries never gained the tactical flexibility of other European battle-winning troops. John Guilmartin attributes this to Janissary musketry's core role in victories over the musket-less Mamluks, postulating that they became too set in their ways as their system had worked too well for too long. The Ottomans were never beneficiaries of Guilmartin's Combined Arms Revolution, which originated with the Spanish around the

turn of the sixteenth century and allowed for compact, rapidly maneuverable bodies of infantry armed with the correct combination of shock and shot.^{iv}

Aside from the Janissaries, however, the Ottomans retained their taste for melee and horsemanship for too long to change into an infantry force even as cavalry became a supporting unit on the battlefield and the gun-line became the norm for European armies. Their famous cavalry had ruled the battlefield for too long and was too ingrained in the structure of battle. While in the seventeenth century, according to Geoffrey Parker, proportions of infantry to cavalry in European orders of battle were climbing steadily, in Ottoman armies the proportion remained at one infantryman to every three horsemen. The strength of the Janissary corps peaked at 40,000 men in the second half of the seventeenth century with just over half of those actually available for service, when troops with handguns were winning battles and the numbers of infantry in European armies were rising exponentially.^v

Such was the Ottoman infantry revolution, encapsulated in the muskets of the Janissary corps. Was it, indeed, revolutionary? To a certain extent it had to be since it led to early victories over other Muslim powers that lacked similar elite units wielding modern firearms and because it anticipated such developments on the European battlefield by several years. However, its universal success was limited as the Janissaries refused to adopt modern tactics to go along with their guns, and their numbers were always less than those of the cavalry, even at a time when cavalry was being relegated to a secondary role on the battlefield; though the revolutionary candor of this parallel innovation cannot be denied, its overall legacy appears to be negligible. For the Ottomans, success in the short-term for their gunpowder-armed troops would lead to long-term stagnation.

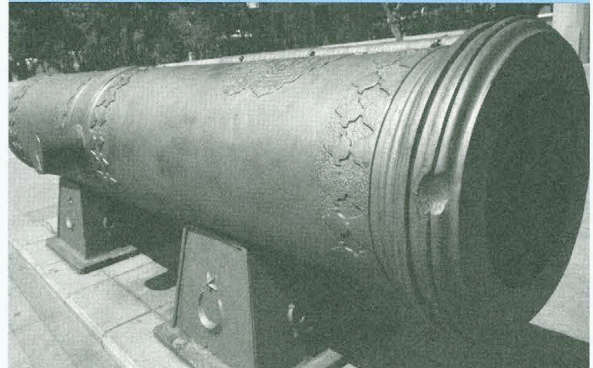
THE ARTILLERY REVOLUTION

We turn to the year 1453 to find the first truly revolutionary expressions in the Ottoman military machine. Here is the siege of Constantinople, the boldest expression of the

might of the Ottoman military and the first example of Rogers' artillery revolution of the fifteenth century, when advances in artillery technology caused it to become devastatingly powerful, thereby rendering old-style masonry fortifications obsolete.^{vi}

Though gunpowder artillery had been in use by both Muslim and Christian forces in Europe prior to the siege of Constantinople, there is no finer example of the power of gunpowder against old style fortifications. Sir Steven Runciman acknowledges that earlier artillery had been unable to damage solid masonry; it was not until Sultan Mehmet's foundries and the Hungarian engineer Urban devised a mighty cannon "that would blast the walls of Babylon itself" in 1452 that artillery became an important factor in siege warfare against heavily fortified city and castle walls.^{vii} While smaller, more mobile artillery was used to take the less-fortified outlying towns of Therapia and Studios, the mighty mortar of the Urban cannon, drawn by sixty oxen over a bridge specifically built to hold its heft, was used to blast away the walls of Constantinople herself.^{viii} Though this one gun—the basilisk—was by far the largest, the Ottoman army was equipped with further batteries of heavy gunpowder artillery, the like of which had never been seen on a battlefield before. This represents both a revolution in technology, with the first mighty cannon capable of devastating heavy masonry, and tactical thinking, as the expertise required to move and handle such a weapon must

IMPRESSIVELY LARGE CANNONS WERE INSTRUMENTAL TO THE OTTOMAN VICTORY AT CONSTANTINOPLE.



have proven a unique challenge for engineer and general alike.

How the Ottoman artillery fared in the battle becomes an important question, as its effectiveness is an important issue in evaluating its revolutionary value. Though one might have thought that the Ottoman conquest of Constantinople was easily achieved due to numerical superiority, in personal and naval combat the Christian forces proved superior. It was only because of the work of Turkish gunpowder artillery that the siege was successful; Ottoman

and thus any future revolutions in early modern warfare.^{xi} Clifford Rogers agrees, claiming that this “artillery revolution,” begun by the Turks with the invention of such heavy artillery, was one of the stages of the early modern military revolution. It was the causative factor for the “fortification revolution” of the sixteenth century, Rogers’ next stage.^{xii} Here, at the walls of Constantinople, is the first evidence of a military revolution, years before Charles VIII’s 1494 invasion of Italy, the campaign most often associated with being the spearhead for the artillery revolution by modern scholarship.^{xiii}

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attempts to breach the city’s walls by mangonels and sapping were ineffective.^{ix} Kelly DeVries points out that the large guns employed by the Turks were invariably highly vulnerable to defensive artillery fire, but the Byzantines had very few of these guns, and those they did have were ill-placed and incapable of dealing with the heavy volume of large-bore cannon fire.^x Here can be seen the massive advantages that an army utilizing the new devastating Turkish-style artillery during a siege had over both a besieging army using old-style siege engines and a defending army that lacked batteries of gunpowder artillery of its own.

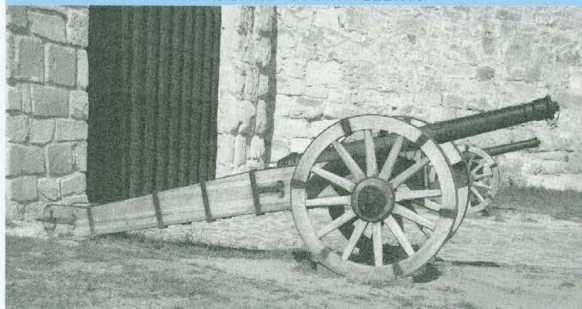
There can be no doubt that the technology utilized by the Turks in 1453 was revolutionary. In fact, it is truly the causative and decisive factor in all the other military revolutions that were to come. If the military revolution was, as Geoffrey Parker argues, essentially driven by the spread of the *trace italienne* fortress, designed to withstand the roar of artillery when older style masonry fortifications could not, then it was this single invention—the Turkish bombard—which would bring about the invention of these fortresses

Though the origins of the artillery revolution belong to the Ottomans, the aforementioned case of Charles VIII’s campaign in Italy in 1494 does give us some notion of why the Ottomans failed to keep up their advantage. Guilmartin explains that while the mighty Turkish bombards of the mid-fifteenth century were capable of inflicting more damage shot-for-shot, the mobility and rate-of-fire of the French cannon were more impressive.^{xiv} Ostensibly, their smaller size also allowed them to be produced faster and cheaper and thus would allow them to be fielded in larger numbers, to say nothing of the need for less space per artillery piece and less draft animals to move the pieces. However, the Ottomans continued to prefer the larger, more unwieldy pieces of artillery even as the French proved that smaller, more mobile artillery was more efficient than the massive Turkish bombard, despite the fact that most of the cannonmasters employed in the foundries of the Sultans were Europeans.^{xv} It is interesting to note that England was employing engineers from the same places the Ottomans were, yet the English were able to, by the mid-sixteenth century, break free of their reliance on continental founders

and keep pace with the modernization of artillery.^{xvi} Again, the theme of Ottoman anticipation of a period of military revolution with innovative work followed by a refusal to change a winning, but quickly outmoded, formula crops up; in reference to advances in artillery, Paul Coles calls them “prisoners of their origins.”^{xvii} Their supreme stubbornness would, over time, undermine the Turkish military machine in every aspect.

Lack of materials hurt Turkish foundries as well. Iron, the material of choice for artillery manufacturing in Europe, was scarce in the Empire while copper was plentiful. Therefore, the Ottomans continued to predominantly make use of brass in casting pieces. Indeed, European observers noted their lack of cast-iron artillery as late as the later half of the eighteenth century, and claimed that any found in fortifications or aboard ships had been taken or purchased from Christians.^{xviii} Iron reduced the price of a gun enough that European armies that embraced iron founding were able to field about twelve iron guns at roughly the same cost as one bronze piece. In addition, engineers in the Low Countries and France made advances in gunpowder technology that allowed for a more explosive ignition as well as advances in iron cannonballs that were more damaging; both of these advances increased the difference between Christian and Turkish artillery that had already become apparent less than a century after Constantinople.^{xix} In a sign of how little the Turks had advanced from their origins, on the other hand, incredulous English sailors in the Bosphorus in 1807 were bombarded

BY THE SIXTEENTH CENTURY, IRON CANNONS WERE AT THE VANGUARD OF ARTILLERY.



by stone balls which had been anachronistic elsewhere for centuries.^{xx}

The perfect example of Ottoman passion for the huge, out-dated siege guns comes as late as the Russo-Turkish War of 1768-1774, at a time when elsewhere in Europe founders had developed extremely mobile and efficient artillery in a modern vein. A French officer, Baron De Tott, who had been placed in command of the defense of the Dardanelles, related an episode involving such an artillery piece. A bronze gun of preposterous size that fired a marble ball was placed in the castle overlooking the strait. In event of a siege, it would take so long to fire that it would be nearly useless, but the Turks were obsessed with the idea of such a massive gun and urged that a single shot would be enough. The officer decided to give it a test run, which caused the entire Turkish crowd to run away; the shock from the blast was “like an earthquake,” and the marble ball divided into three pieces at three hundred fathoms.^{xxi} Such an artillery piece, so revered by the Ottomans, would have been next to useless in defense, as the French officer who was well-acquainted with European artillery knew, yet this serves as a perfect example of the Turkish obsession with large, unwieldy, outmoded cannons made from and firing anachronistic materials.

Furthermore, the Ottoman obsession with these big siege guns was detrimental to their success in the field. Coles claims the reason was that the Ottomans had originally been irresistible as a cavalry force in the open field, so artillery had never been necessary, and indeed would have slowed down their mobile forces. The Ottomans became convinced that artillery was a siege weapon and not necessary for success in pitched battles.^{xxii} Whatever the reason, it is clear that the Turks never caught on to the revolution in field artillery. Raimondo Montecuccoli, who routed the Turks at St. Gothard in August 1664, wrote:

... [This] enormous artillery of the Turks produces great damage when it hits, but it is awkward to move and it requires too much time to reload and sight. Furthermore, it



AN OUTMODED TURKISH FORTRESS

consumes a great amount of powder, besides cracking and breaking the wheels and the carriages and even the ramparts on which it is placed....Our artillery is more handy to move and more efficient and here resides our advantage over the cannon of the Turks.^{xxiii}

A century later, during the Russo-Turkish War, Baron De Tott made similar remarks, saying that “the first work of the new foundry was to be a train of field artillery of which the Turks were entirely unprovided.”^{xxiv} According to Carlo Cipolla, the advantage of the Europeans was relatively small while the development of light field artillery was still in its infancy throughout the sixteenth and early seventeenth century, but by the mid-seventeenth century enough progress had been made in the development of highly mobile field-guns with a good rate of fire pioneered by the Swedes in the Thirty Years War that the Ottomans were at a substantial disadvantage. This became a decisive reason

behind their decline when, still stubbornly clinging to the notion of artillery as a mere siege engine, they simply could not stand up to mobile European artillery trains in the field, which became increasingly evident in the Russo-Turkish Wars.^{xxv}

Interestingly, historian Rhoads Murphey disagrees with the idea of inferiority, but agrees that the Ottomans gained no inherent advantage over their European rivals because of their early revolution in artillery. While the Ottomans may not have had effective field artillery, it did not particularly matter until the latest stage of the early modern period, long after Rogers’ proposed artillery revolution, because of the range of artillery pieces. Seventeenth-century field guns could only fire at a range of 200 to 300 meters, while the heavier siege guns had to be placed right in front of their targets, and their effectiveness was often dampened by the instability of gunpowder and relied on the expertise

of the artillery crews. Murphey claims that Ottoman success against non-gunpowder states such as the Mamluks and Safavids had more to do with the Janissaries and their handguns than artillery, an idea Cipolla agrees with.^{xxvi}

Between the lack of materials and the seemingly perpetual theme of the Ottomans being unwilling to change a winning formula, no matter how outmoded it had become as their European rivals developed further innovations, the pathway to stagnation had been laid. The innovative Ottomans of 1453 turned into the stagnating Ottomans just a century later, though it would take further revolutions before the lag became evident.

THE FORTIFICATION REVOLUTION

The fifteenth through seventeenth centuries are generally acknowledged as the golden age of Turkish civilization, an era when it was amongst the greatest powers in Europe. At the beginning of this era, as we have seen, it had toppled the once-mighty Byzantine civilization with the use of the most devastating gunpowder siege artillery ever deployed on a European battlefield. Though they refused to adopt field artillery when other European powers did, they continued to produce impressive siege pieces.

In the sixteenth century, the preponderance of artillery fortresses that began to spread across Europe following the Turkish innovation in heavy-bore artillery and the subsequent adoption of such heavy guns by European armies strangled the Turkish military head-start in its infancy. McNeill notes that by the 1560s, modern style fortifications had spread throughout Europe enough to halt Ottoman expansion and render their advantages in siege technology useless. His basis for this assumption is the failure of the 1565 Siege of Malta.^{xxvii} Guilmartin believes that the fortification revolution had come as early as 1532, when a seven hundred man garrison at Güns withstood the entire Ottoman army for twenty days.^{xxviii} Whatever the case, it appears clear that by the mid-sixteenth century, the Turks' European rivals had developed technology that blunted their previous advantage in siege weaponry.

However, Murphey disagrees with this notion. He concludes that:

... the expense of introducing these improvements removed in terms of the everyday practice of warfare any theoretical advantage such improvements might have conferred. Several of the fortresses, newly constructed or thoroughly upgraded to conform with the 'modern style' and considered by then-current standards virtually impregnable, still succumbed in the face of determined Ottoman attack.^{xxix}

His examples are Uyvar in 1663 and Candia in 1669, two sieges that occurred at the twilight of the Ottoman military machine and over a century after the two dates offered by Guilmartin and William McNeill.^{xxx} According to him, relatively few of the fortresses protecting the border between Ottoman and Habsburg territories were "constructed elaborately enough . . . to withstand even the haphazard attacks

"Like with their attachment to cavalry and giant guns, the Turks continued to prefer old medieval style castles with very few modifications . . ."

of Hungarian insurgents, let alone more determined assault by fully-equipped and well-trained Ottoman armies."^{xxxi} However, Murphey does not address the siege of Malta, one of the best examples of the failure of Ottoman siege warfare facing a new-style of fortification. Though he makes it clear that these innovative designs were not necessarily as impregnable as Parker may have claimed, they still obviously existed as a massive barrier to Ottoman forces, even if their use was not as widespread as imagined.

While the Ottomans were challenged to besiege their rivals' new *trace italienne* fortresses, they themselves never actually participated in the fortification revolution. Like with their attachment to cavalry and giant guns, the Turks continued to prefer old medieval style castles with very few modifications to account for modern siege engines. Logically, the Habsburgs should then not only have been able to contain the Ottomans with their own forts but also to rollback their advances and capture swathes of territory for themselves. In practice, this did not occur until much later, and Turkish armies continued to advance into Habsburg territory and besiege their fortifications and cities until the end of the seventeenth century. Likewise, the Habsburgs failed to gain any territory worth mentioning until the Treaty of Karlowitz in 1699. If the new style of fortifications were indeed revolutionary, the existence of *trace italienne* fortresses in one realm and the lack of them in the other should have produced rapid and noticeable changes in military outcomes; as it stood, however, there was no distinguishable advantage gained until long after the end of the fortification revolution.^{xxxii}

While the Ottomans displayed their characteristic attachment to the past when dealing with new style fortifications, this seems to not have had the blatant debilitating effect that their backwardness in other realms of the military revolution did. They were able to effectively besiege new style bastions on several occasions and their own outdated fortresses did not begin to fall until the end of the seventeenth century, which was long after the fortification revolution as proposed by Rogers and Parker. Its particulars elsewhere in Europe notwithstanding, the idea of a fortification revolution had only a minimal discernible effect on the military realities of the Ottoman Empire.

THE FIREPOWER REVOLUTION

Though guns and field artillery had begun to rule the open battlefield, shock weapons still had their uses in warfare up until the eighteenth century. Murphey writes that despite their diminishing importance in the field, they were of ultimate importance in the siege when it came time for an as-

sault. Handguns were restricted to providing cover for soldiers rushing in with swords, hatchets, and halberds. Firing muskets was too risky in the midst of a general melee; stopping to reload would put soldiers in a fatally vulnerable position, and any non-fatal shot would undoubtedly result in the musketeer being killed by an enemy armed with an outmoded, but more useful, hand weapon.^{xxxiii} In an assault on a fortification, it remained numbers and personal skill and not technological superiority that determined the victor.

That lasted until two infinitely important innovations, the flintlock handgun and the socket bayonet, were adopted in the seventeenth century by the vast majority of European armies.^{xxxiv} A flintlock firing mechanism allowed a gun to be reliably fired in wet conditions, while matchlock guns had suffered when powder became wet. Additionally, the quick-fire at the pull of a trigger as opposed to a slow burning match meant that it was much easier to aim and thus hit a moving target, rendering the guns more practical for use up close. The elimination of the match also drastically reduced casualties from accidental discharge or ignition of nearby sources of powder. The socket bayonet was introduced around the turn of the eighteenth century, and allowed an infantryman to serve as both a missile and shock troop at once (earlier models of bayonets had plugged the muzzle of the bayonet, preventing the gun from firing). This eliminated the need for pikes and meant that soldiers with firearms were no longer susceptible to cavalry charges, ending their most glaring vulnerability. These two inventions changed the lay of the battlefield forever, as the standard infantryman became quite versatile, capable of laying down fire, defending against charges, and counter-charging itself; the Ottomans, by this time a "third tier arms producer" according to Jonathan Grant, had to rely on European imports to get these weapons, as their factories in Istanbul were incapable of producing them. The matchlock without a bayonet remained their weapon of choice until the nineteenth century.^{xxxv}

OTTOMAN SOLDIERS DISPLAY THEIR TECHNOLOGICAL MIGHT IN THE VICTORIOUS SIEGE AGAINST CONSTANTINOPLE.



For the Ottomans, the results of this firepower revolution were devastating. As we have seen, the Ottomans continued to rely on their cavalry, and now that cavalry had no advantage in the open field as it had before. Without flintlock weapons or bayonets, the Janissaries, formerly able to keep pace with their European counterparts in the period of relatively little change between 1500 and 1700, were quickly outmoded. Due to their lack of any sort of light, mobile field artillery only served to compound the problem. Beginning with the Treaty of Karlowitz in 1699, the Ottomans began to lose large amounts of territory irrevocably. Belated attempts in the eighteenth and early nineteenth centuries to reform the military were either resisted by the old guard or too late to be any use in preventing the ultimate decline of the Ottoman military machine. The military revolution had, at last, taken its toll.

CONCLUSION

In a greater context, what does the Ottoman case tell about the early modern military revolution? Starting from the end of the era, it certainly fits into Jeremy Black's theory of a later revolutionary period rather than an earlier one; despite their eventual backwardness, the Ottomans managed to keep pace militarily with their European rivals and even continue to threaten them up until the all-important flintlock and bayonet were introduced.^{xxxvi} It also holds up Clifford Rogers' infantry and artillery revolutions, and even in some ways helps to impel them, courtesy of the Janissaries and artillery. Parker's fortification revolution, however, while existing in the Ottoman context, provided very little actual change in the realities on the ground.

The case of the Ottomans is a particularly interesting one because of how the Empire's military history truly begins with a revolution of their own in firearms, from handguns to artillery, and ends with their inability to join another revolution on similar grounds several centuries later. Were they a "gunpowder empire"? Because Goldschmidt never defines what, exactly, a gunpowder empire is, the answer is open-ended. However, despite Murphey's reluctance to use such a term to describe the Ottomans, the evidence re-

mains that, at least in the early modern period, the Turkish military establishment first lived by its revolutionary use of handguns and artillery and later died by its inability to do the same.^{xxxvii}

ENDNOTES

- i. Cipolla (99)
- ii. Goldschmidt (111-135)
- iii. Rogers 1995 (56-60)
- iv. Guilmartin (302-3)
- v. Murphey (35-40, 47); Parker (340-341)
- vi. Rogers (109-10)
- vii. Runciman (77-8)
- viii. Nicolle (41-2)
- ix. *Ibid.* (64-5)
- x. DeVries (160)
- xi. Parker (338-345)
- xii. Rogers (63-70)
- xiii. Raudzens (407)
- xiv. Guilmartin (304)
- xv. Adyuz (11-13)
- xvi. Krause (40)
- xvii. Coles (186)
- xviii. Cipolla (99)
- xix. McNeill (85-88); Carlo Cipolla (40-42) says that the cost of a cast-iron gun was three to four times less. Regardless, it is apparent that it was far cheaper to field iron pieces than bronze pieces, and the lack of cast-iron guns was a major deficiency in the Ottoman army long into the modern period.
- xx. Cipolla (98)
- xxi. *Ibid.* (96-97)
- xxii. Coles (186)
- xxiii. Cipolla (98-99)
- xxiv. *Ibid.* (99)
- xxv. *Ibid.* (98)
- xxvi. Murphey (13-15); Cipolla (93)
- xxvii. McNeill (91)
- xxviii. Guilmartin (309)
- xxix. Murphey (15)
- xxx. *Ibid.*
- xxxi. Murphey (113)
- xxxii. Guilmartin (310-312)
- xxxiii. Murphey (121)
- xxxiv. Guilmartin (308)
- xxxv. Grant (196-197)
- xxxvi. Black (95-108)
- xxxvii. Murphey 13-14

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